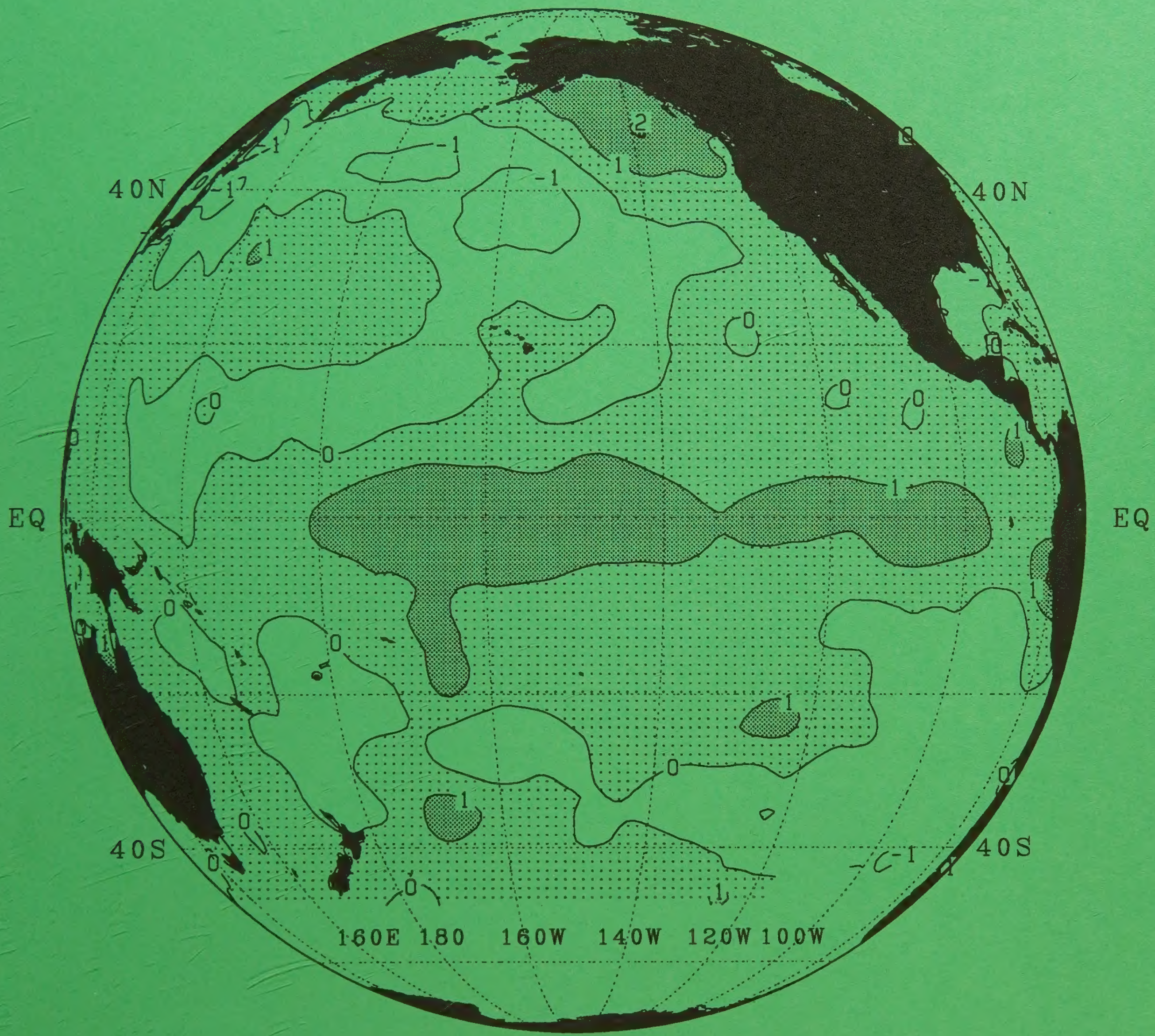
気象庁海洋月報

Monthly Ocean Report
December 2002 (No. 120)



Climate and Marine Department
Japan Meteorological Agency

気象庁 気候・海洋気象部

平成14年12月

気象庁海洋月報は、気象庁 気候・海洋気象部 海洋気象情報室で作成しています。

本月報に関する問い合わせは、
〒100-8122 東京都千代田区大手町１・３・４ 気象庁 気候・海洋気象部 海洋気象情報室まで。
電 話 (03) 3212-8341 (内線 5127、5166)
ＦＡＸ (03) 3211-3047
電子メール ocean@climar.kishou.go.jp

Monthly Ocean Report is prepared by the Office of Marine Prediction, Climate and Marine Department, Japan Meteorological Agency.

Correspondence relating to this report may be directed to :

Yo Nyomura
Head, Office of Marine Prediction
Climate and Marine Department, Japan Meteorological Agency
1-3-4 Ote-machi, Chiyoda-ku, Tokyo 100-8122 Japan
Facsimile: +81-3-3211-3047
e-mail : ocean@climar.kishou.go.jp

表紙は、2002 年 12 月の太平洋の月平均海面水温偏差図です。
陰影部は、平年より高温の海域を示しています。

The figure on the front cover shows the monthly mean SST anomalies for December 2002 in the Pacific Ocean.
Areas of positive anomalies are shaded.

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海況の特徴（２００２年１２月）

日本近海の海況

海面水温は、日本海中部、オホーツク海南部、及び41°N、146°E付近を除く北海道東方から三陸沖にかけて平年より1℃以上低かった。一方、宗谷海峡の西及び南西諸島では平年より0.5℃以上高かった（図４）。

黒潮は、九州南東で離岸した後、四国から紀伊半島に接岸、東海沖を東北東に流れ、三宅島付近を通り、上・中旬は房総半島沖を、下旬は房総半島に接岸して北東に流れていた（図９）。

太平洋の海況

太平洋赤道域の海面水温は、日付変更線から100°Wにかけて平年より1℃以上高かった。一方、140°E付近及び160°E付近では平年より低かった。

北太平洋の海面水温は、45°Nに沿った170°Eから170°Wにかけてと40°N、160°W付近で平年より1℃以上低かった。一方、アラスカ湾は平年より1℃以上高く、＋2℃を超える正偏差も見られた（図１７）。

Highlights December 2002

Seas adjacent to Japan

SSTs were more than 1℃ below normal in the central part of the Japan Sea, in the southern part of the Sea of Okhotsk, and in the seas from east of Hokkaido to off Sanriku except around 41°N, 146°E. SSTs were more than 0.5℃ above normal in the seas west of the Soya Straits and the seas around the Nansei Islands (Fig. 4).

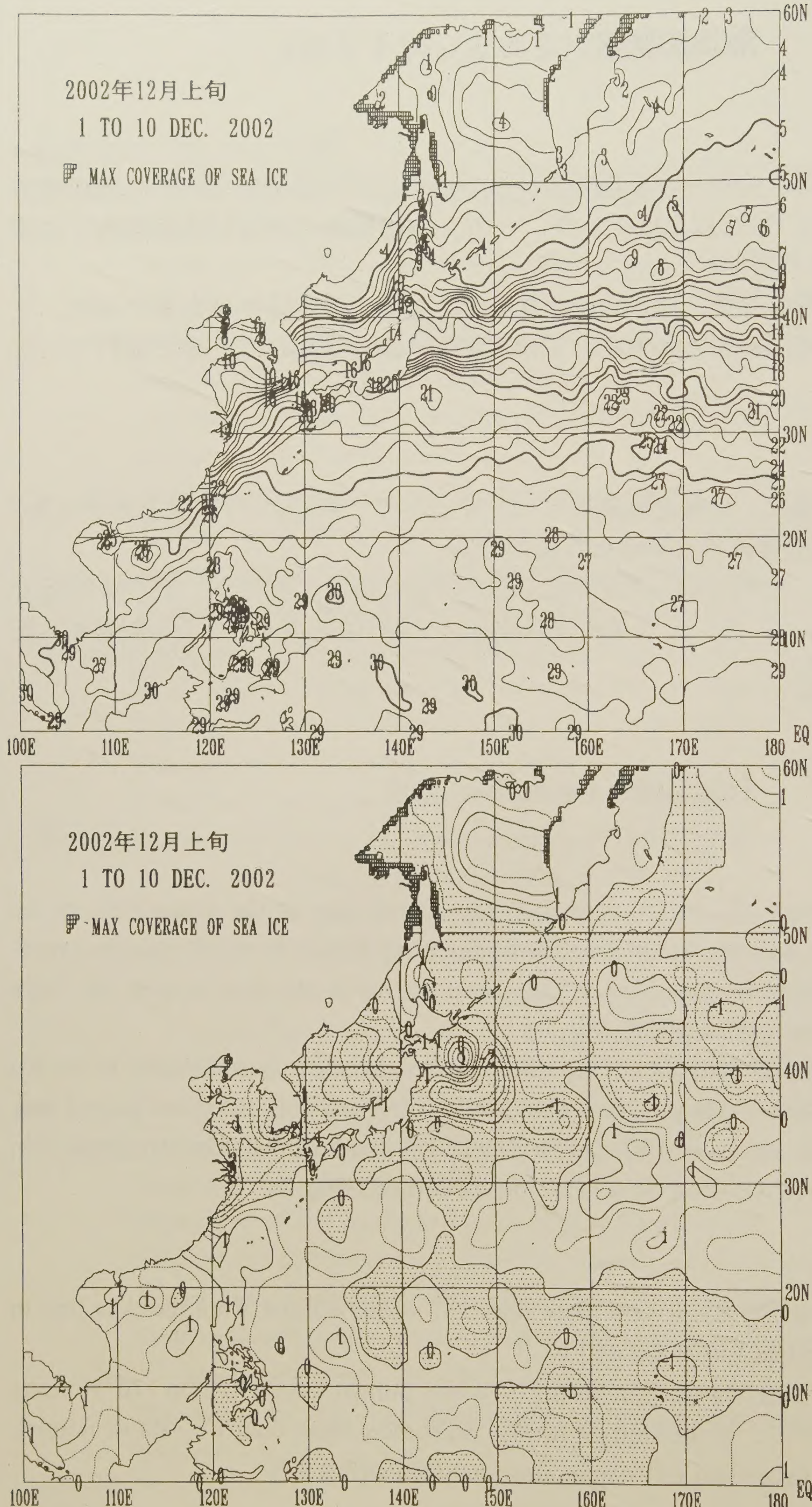
The Kuroshio flowed off southeast of Kyushu and close to coasts from Shikoku to the Kii Peninsula throughout the month. Then the Kuroshio flowed ENE-ward off Tokai and passed near Miyake Island. In the first and second 10 days, it flowed NE-ward off the Boso Peninsula. In the rest of the month, it flowed NE-ward close to the Boso Peninsula (Fig. 9).

Pacific Ocean

In the equatorial Pacific, SSTs were more than 1℃ above normal from the date line to 100°W and below normal around 140°E and 160°E.

In the North Pacific, SSTs were more than 1℃ below normal from 170°E to 170°W along 45°N and around 40°N, 160°W. In the Gulf of Alaska, SSTs were more than 1℃ above normal, and positive SST anomalies exceeding +2℃ were also found there (Fig. 17).

Ten-day mean SST & Anomalies

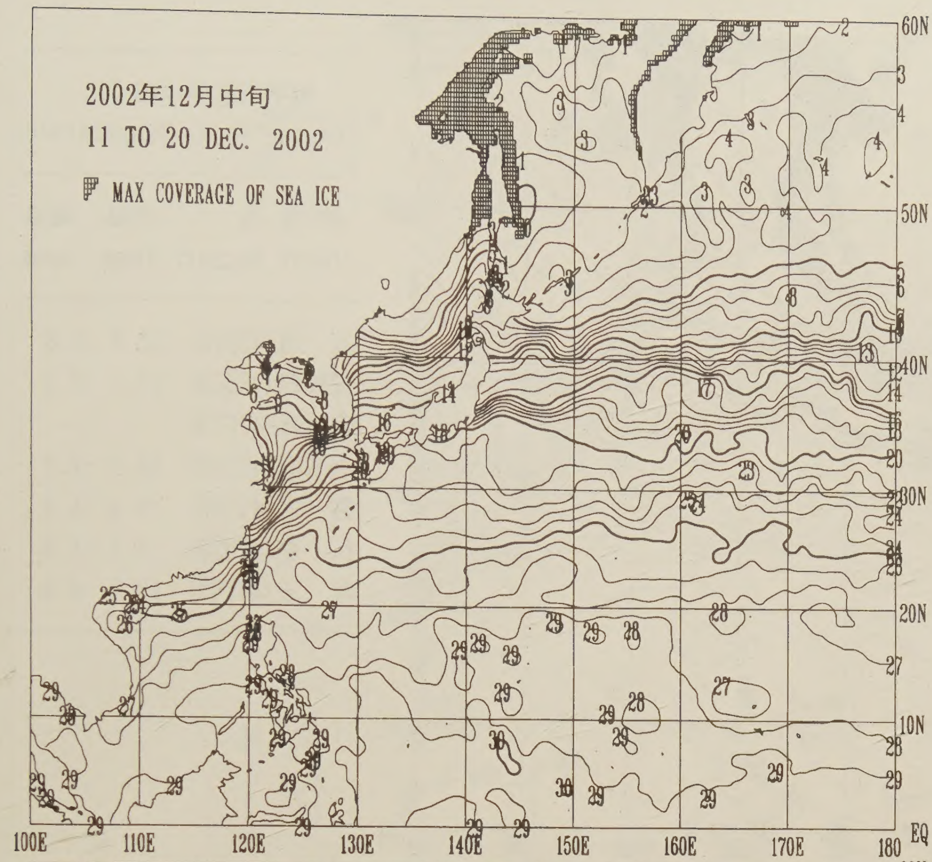


旬平均沿岸水温(℃)
Coastal Water Temperature

地 点 名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣(47918)	24. 2	1. 1
御前崎(47655)	16. 1	1. 4
八丈島(47678)	-	-
小名浜(47598)	12. 3	-1. 8
宮　古(47585)	12. 8	-0. 2
江　差(47428)	10. 1	0. 8
浜　田(47755)	15. 6	-0. 5

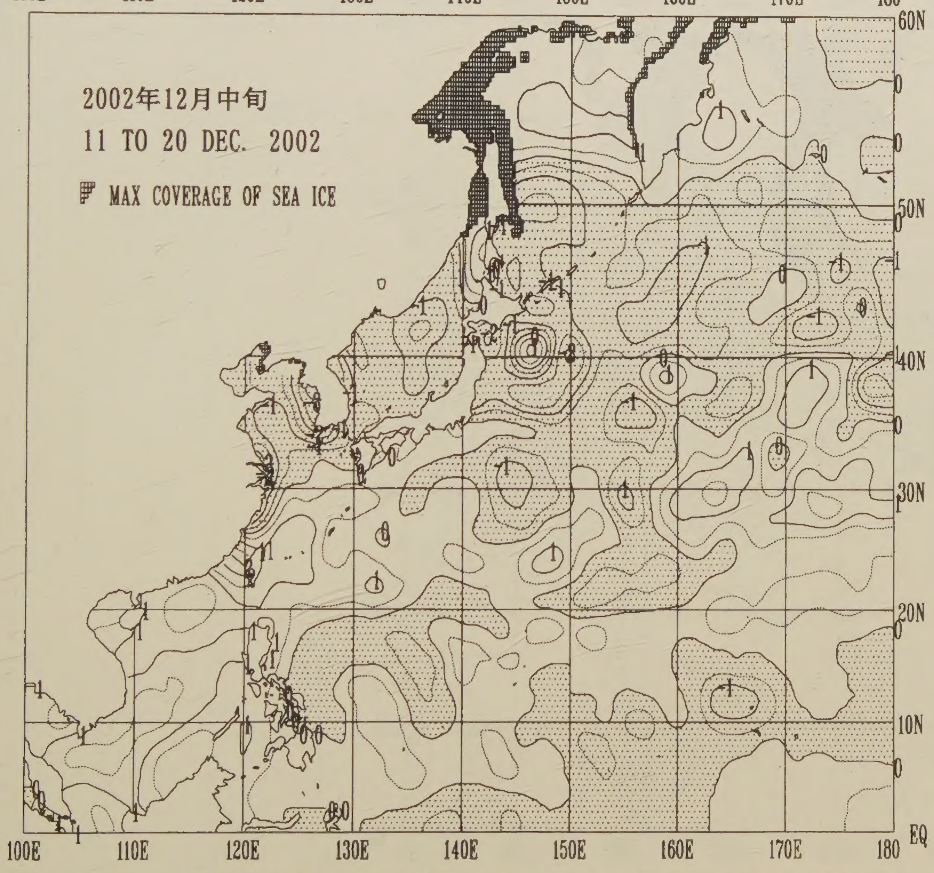
第1図 北西太平洋旬平均海面水温図(上)及び偏差図(下) (2002年12月上旬)

Fig. 1 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 1st ten-day period in DEC 2002. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0. 5°C are shown by broken lines. Negative anomalies are spotted.



旬平均沿岸水温(℃)
Coastal Water Temperature

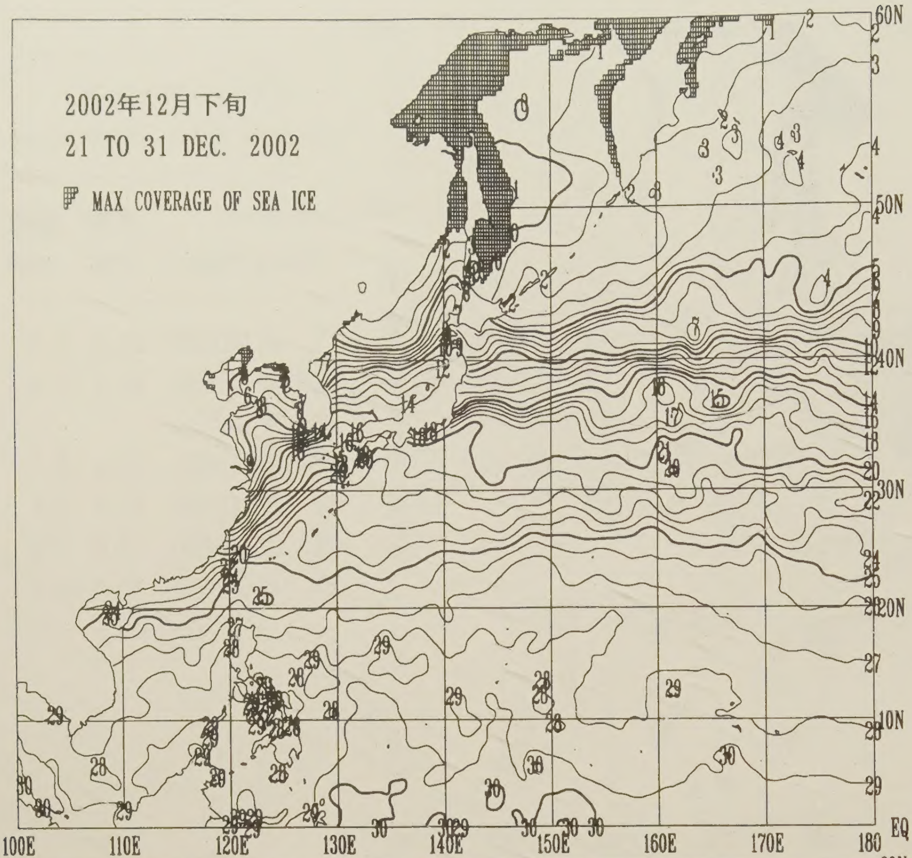
地点名 (Index Number)	水温 Temp.	偏差 Anom.
石垣(47918)	23.4	0.9
御前崎(47655)	15.6	1.8
八丈島(47678)	-	-
小名浜(47598)	10.8	-2.5
宮古(47585)	11.8	-0.1
江差(47428)	6.9	-1.2
浜田(47755)	14.9	-0.2



第2図 北西太平洋旬平均海面水温図(上)及び偏差図(下) (2002年12月中旬)

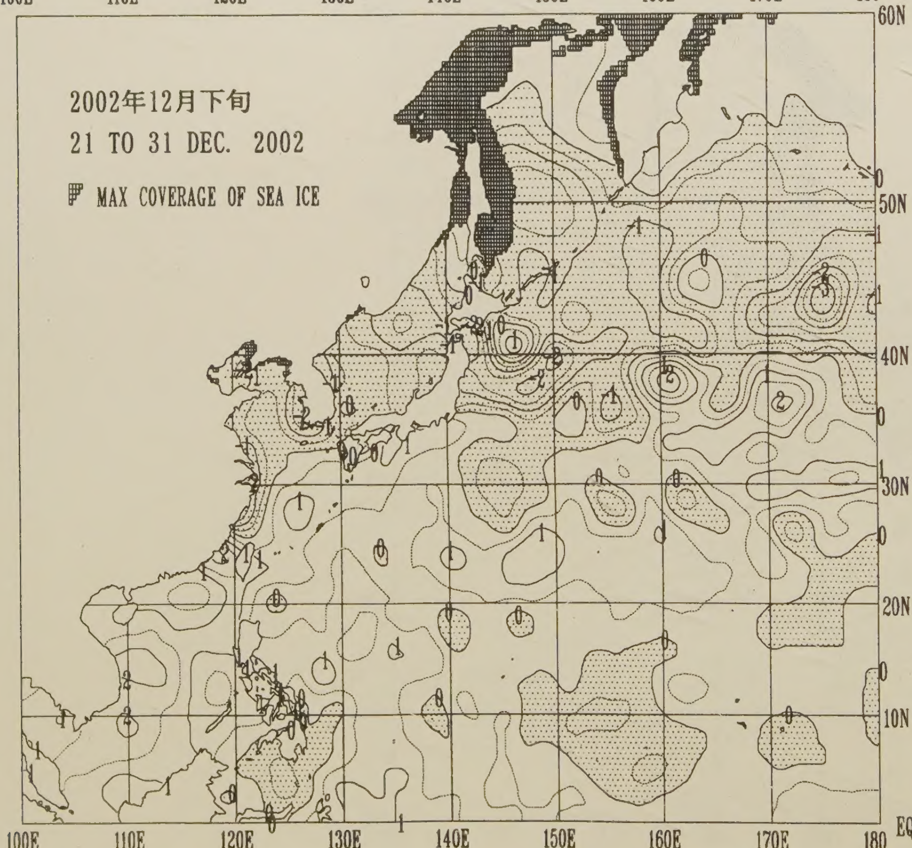
Fig. 2 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 2nd ten-day period in DEC 2002. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.

Ten-day mean SST & Anomalies



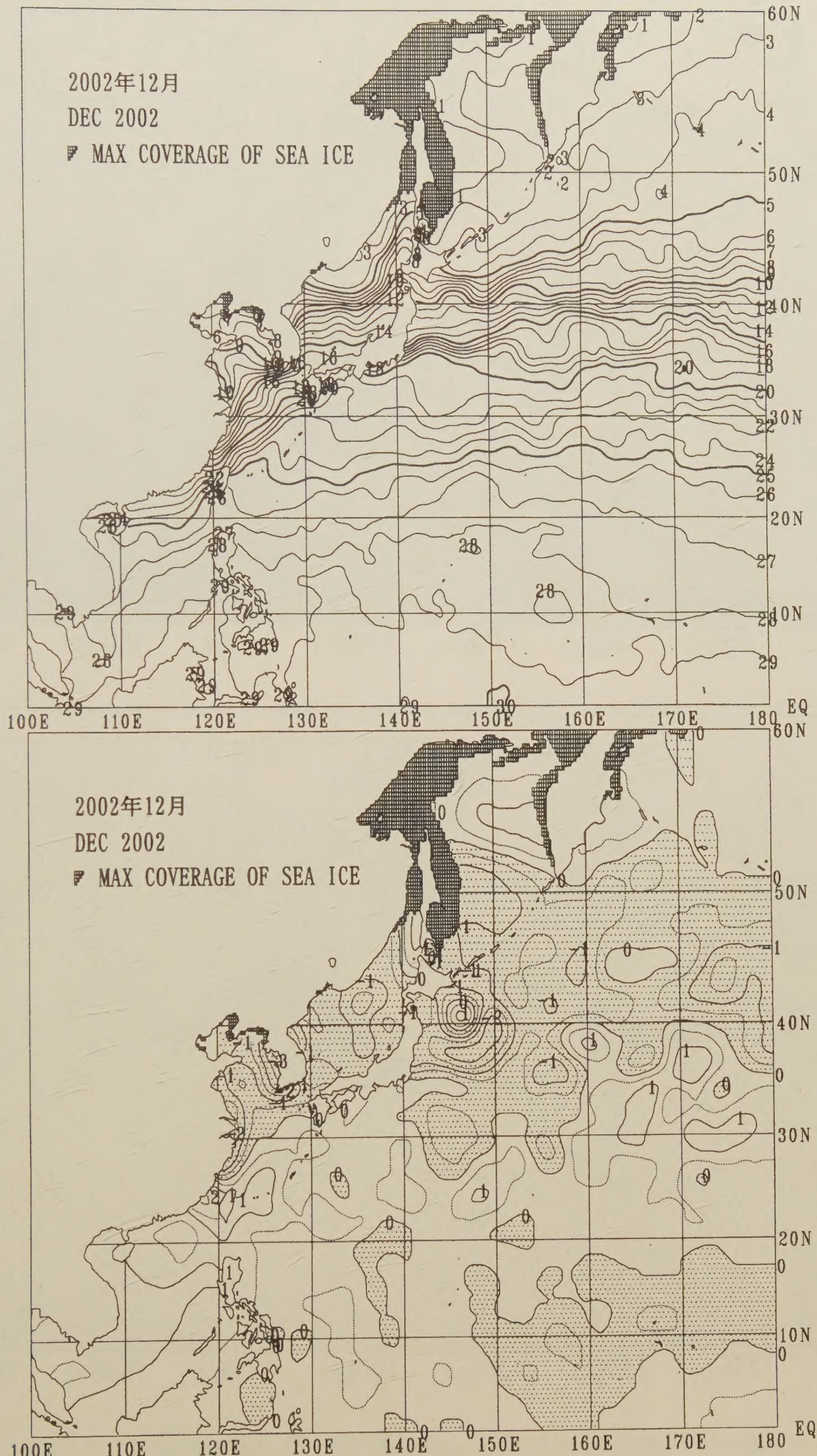
旬平均沿岸水温 (℃)
Coastal Water Temperature

地点名 (Index Number)	水温 Temp.	偏差 Anom.
石　垣 (47918)	22.8	0.8
御前崎 (47655)	13.1	0.1
八丈島 (47678)	-	-
小名浜 (47598)	10.1	-2.2
宮　古 (47585)	9.8	-1.1
江　差 (47428)	6.1	-1.6
浜　田 (47755)	13.3	-0.8



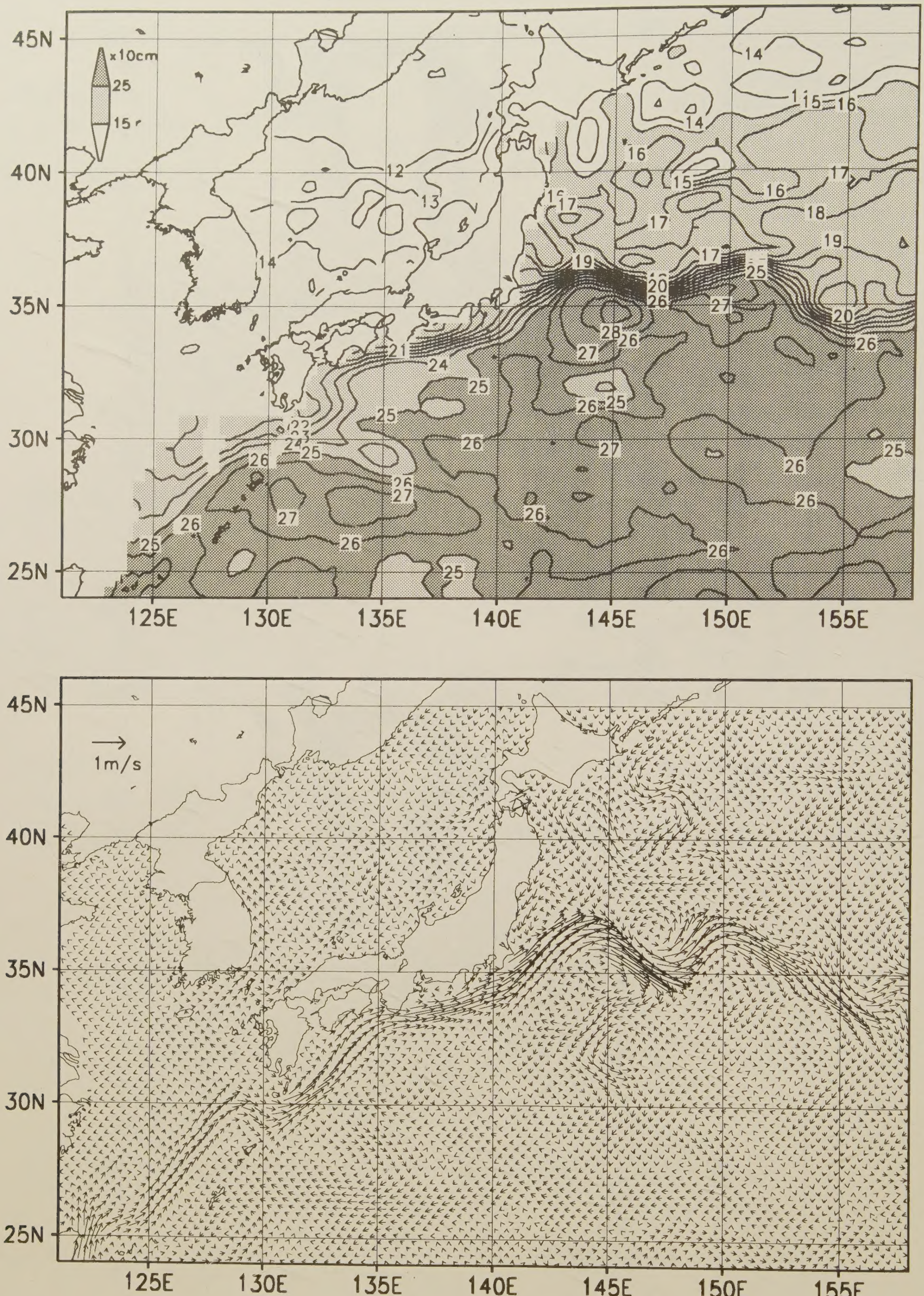
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Fig. 3 Ten-day mean SST (top) and anomalies (bottom) in the western North Pacific for the 3rd ten-day period in DEC 2002. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.



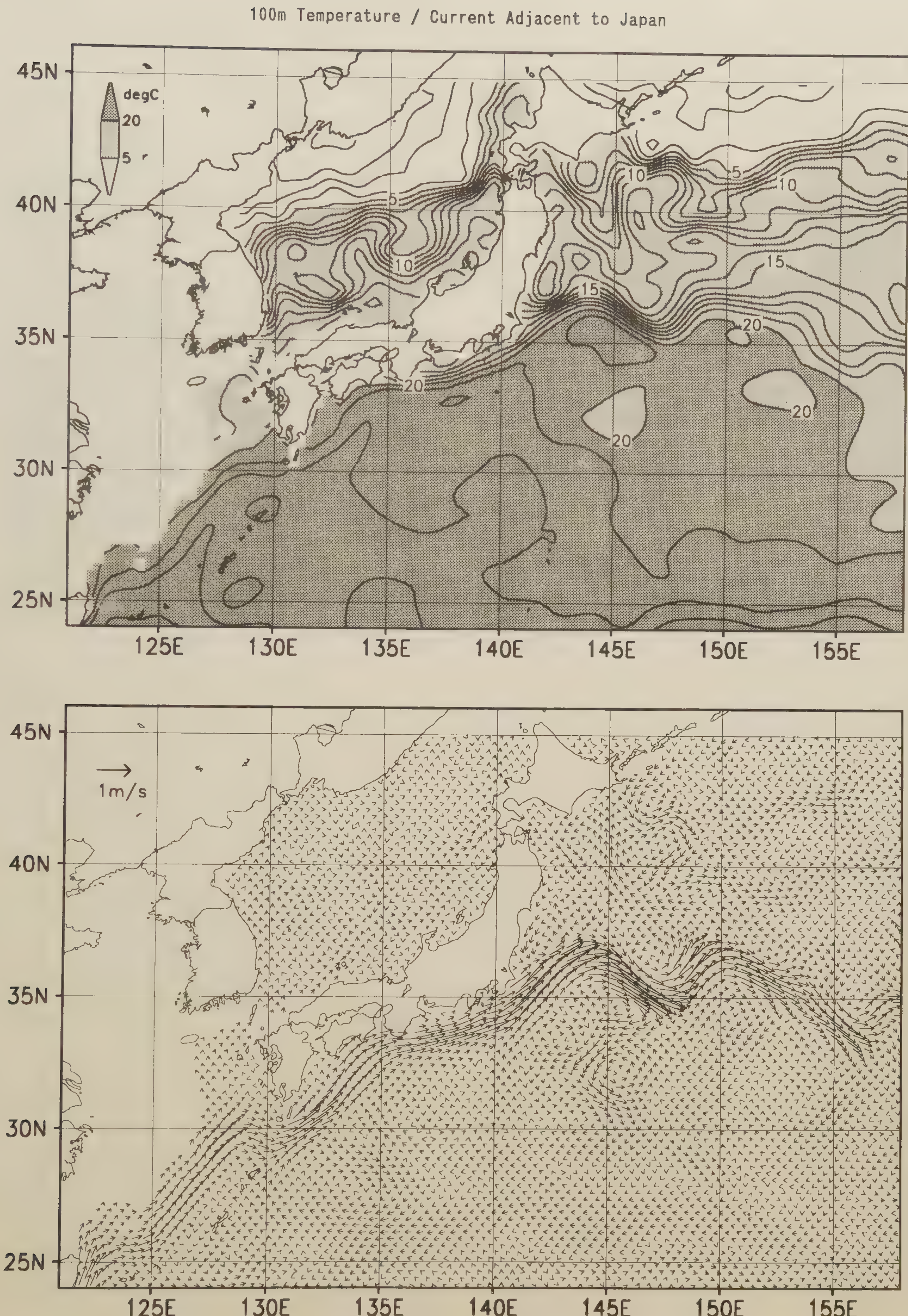
第4図 北西太平洋月平均海面水温図(上)及び偏差図(下) (2002年12月)

Fig. 4 Monthly mean SST (top) and anomalies (bottom) in the western North Pacific for DEC 2002. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C and additional anomaly contours of 0.5°C are shown by broken lines. Negative anomalies are spotted.



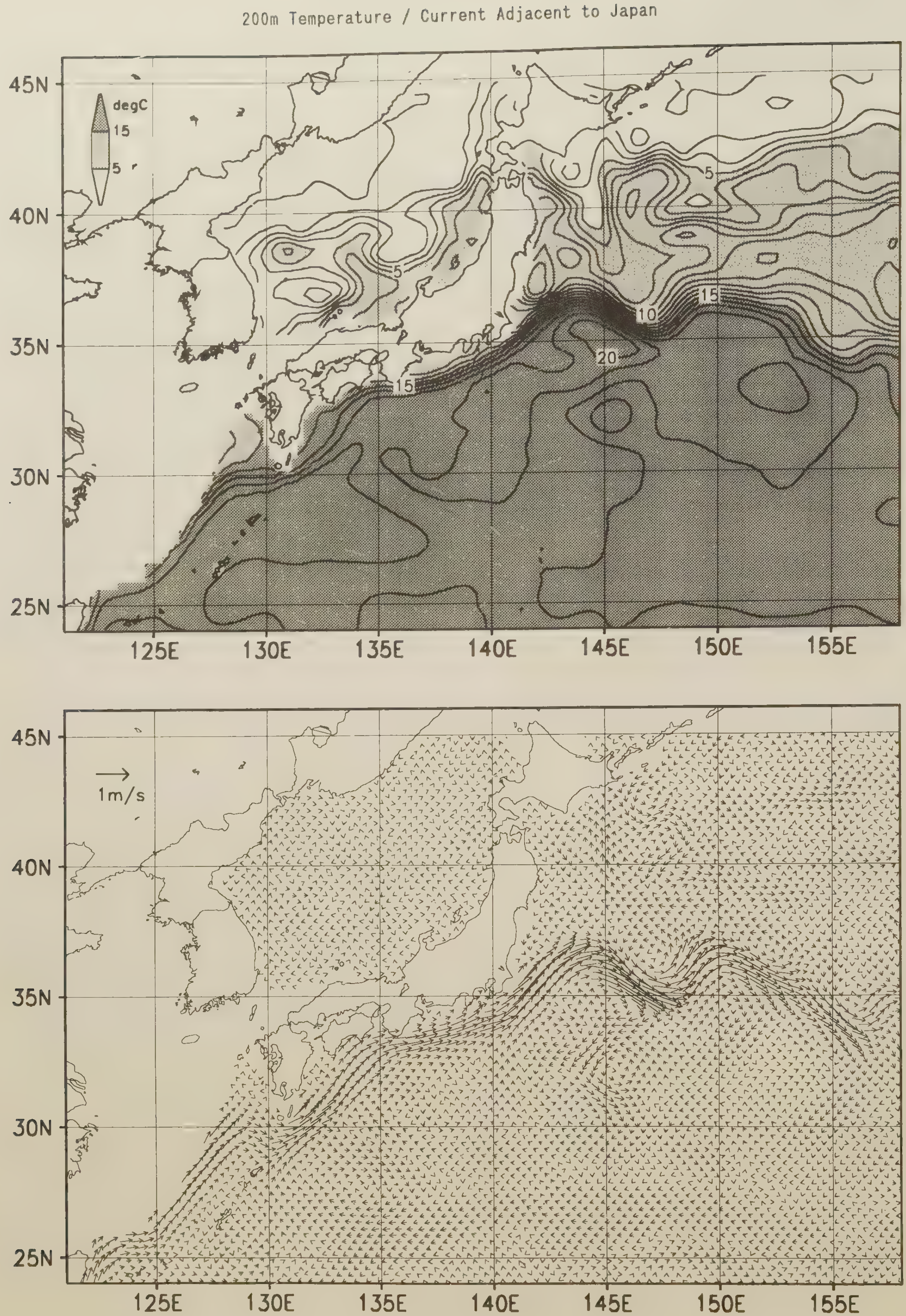
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（海洋総合解析システムによる）

Fig. 5　Monthly mean sea surface height (top) and current (bottom) in seas adjacent to Japan for December 2002. Contour interval is 10cm (top). (calculated by the Ocean Comprehensive Analysis System)



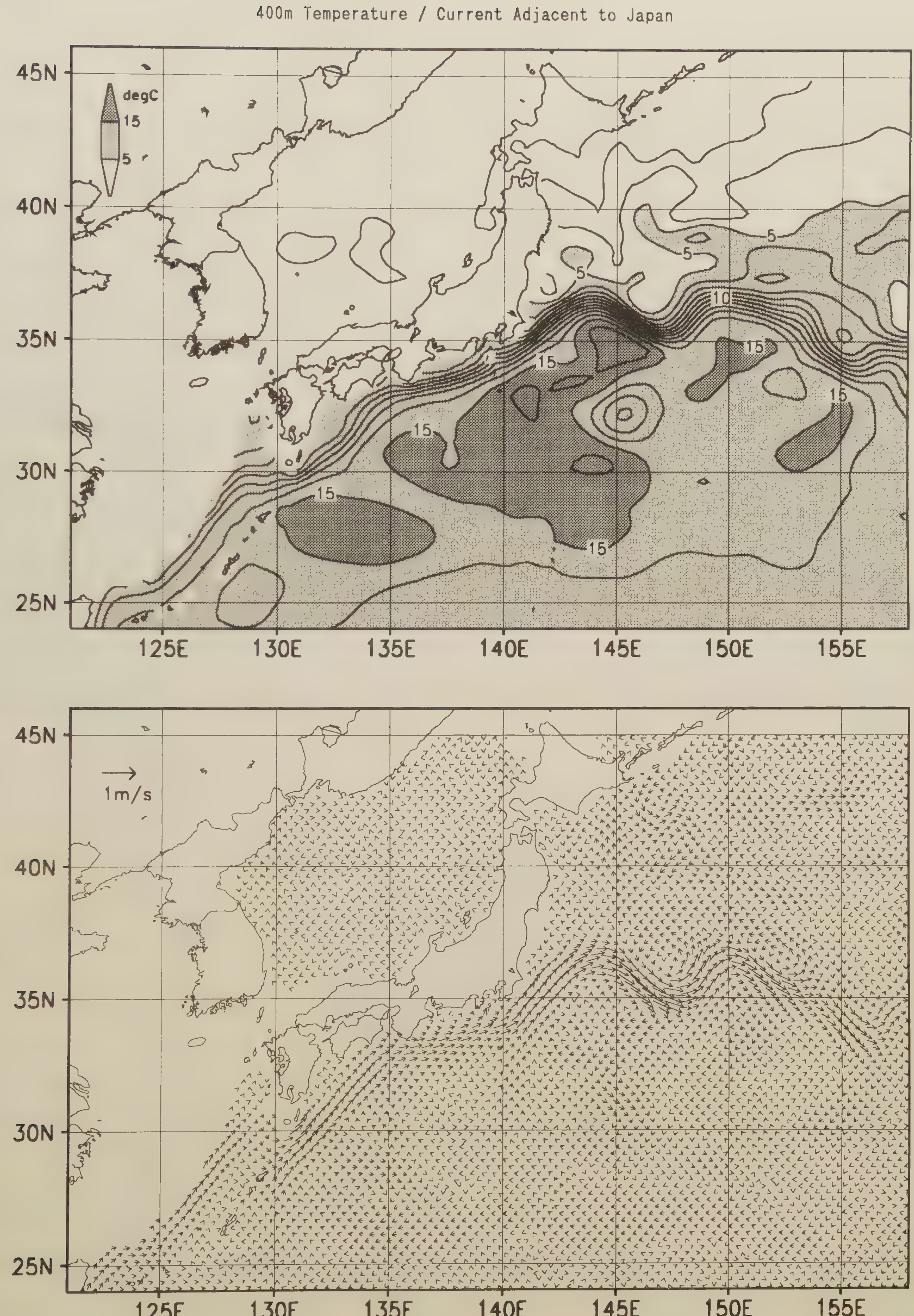
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Fig. 6　Monthly mean subsurface (100 m) temperature (top) and current (bottom) in seas adjacent to Japan for December 2002. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)



第７図　日本近海月平均表層水温図（上）と表層海流図（下）（深さ 200 m）（2002 年 12 月）
（海洋総合解析システムによる）

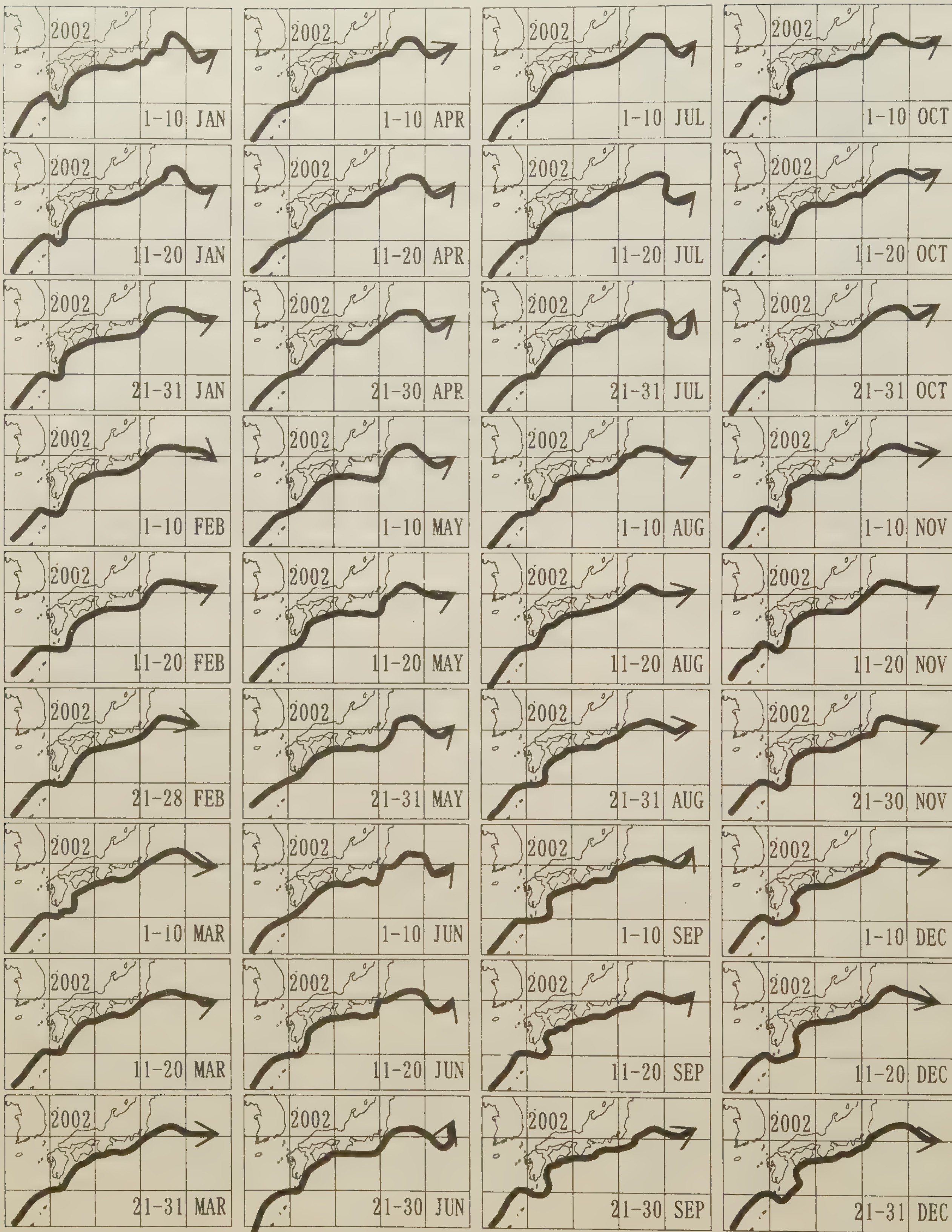
Fig. 7　Monthly mean subsurface (200 m) temperature (top) and current (bottom) in seas adjacent to Japan for December 2002. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)



第8図　日本近海月平均表層水温図（上）と表層海流図（下）　（深さ 400 m）（2002 年 12 月）
（海洋総合解析システムによる）

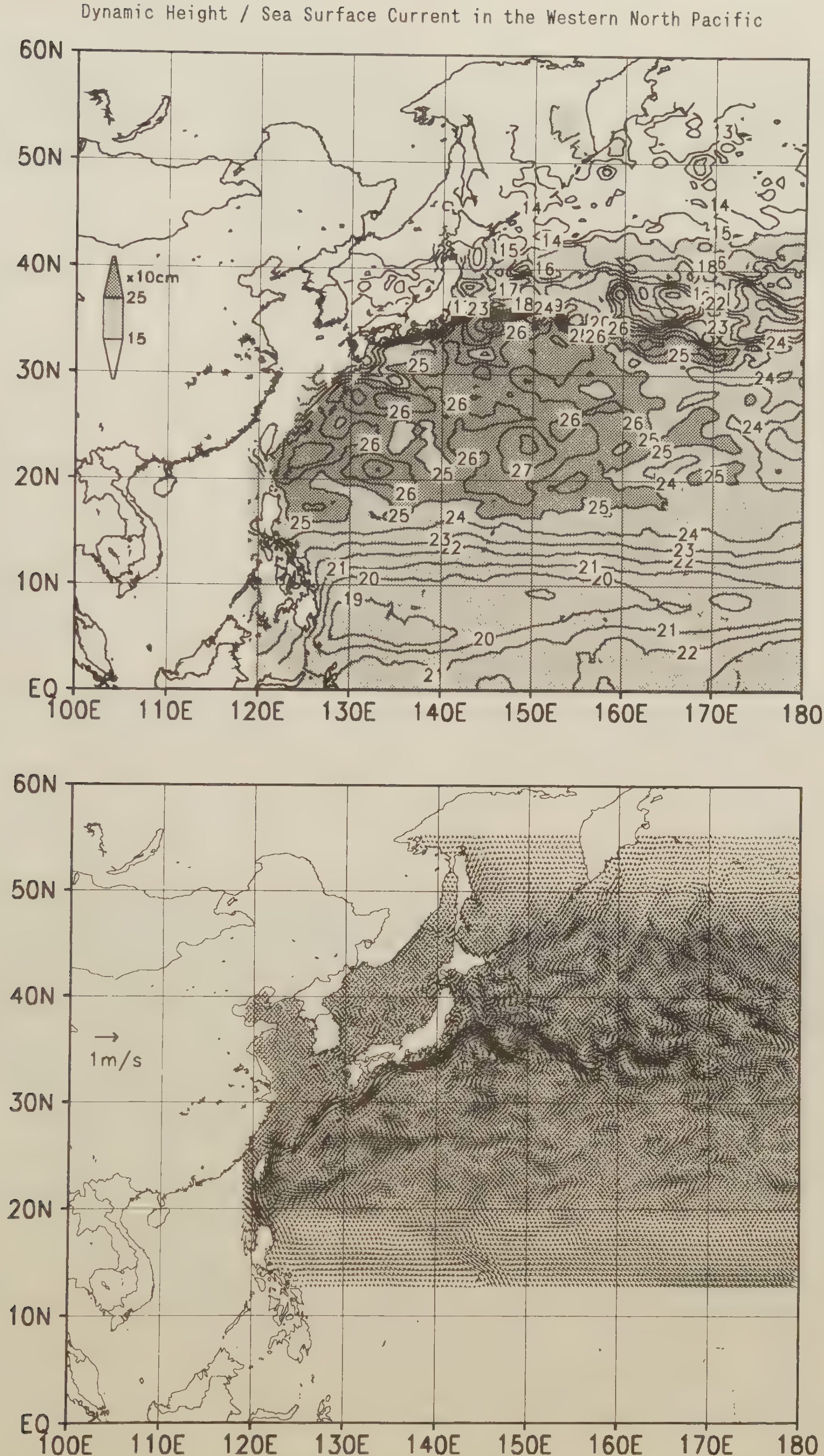
Fig. 8　Monthly mean subsurface (400 m) temperature (top) and current (bottom) in seas adjacent to Japan for December 2002. Contour interval is 1 ℃ (top). (calculated by the Ocean Comprehensive Analysis System)

Location of the Kuroshio axis



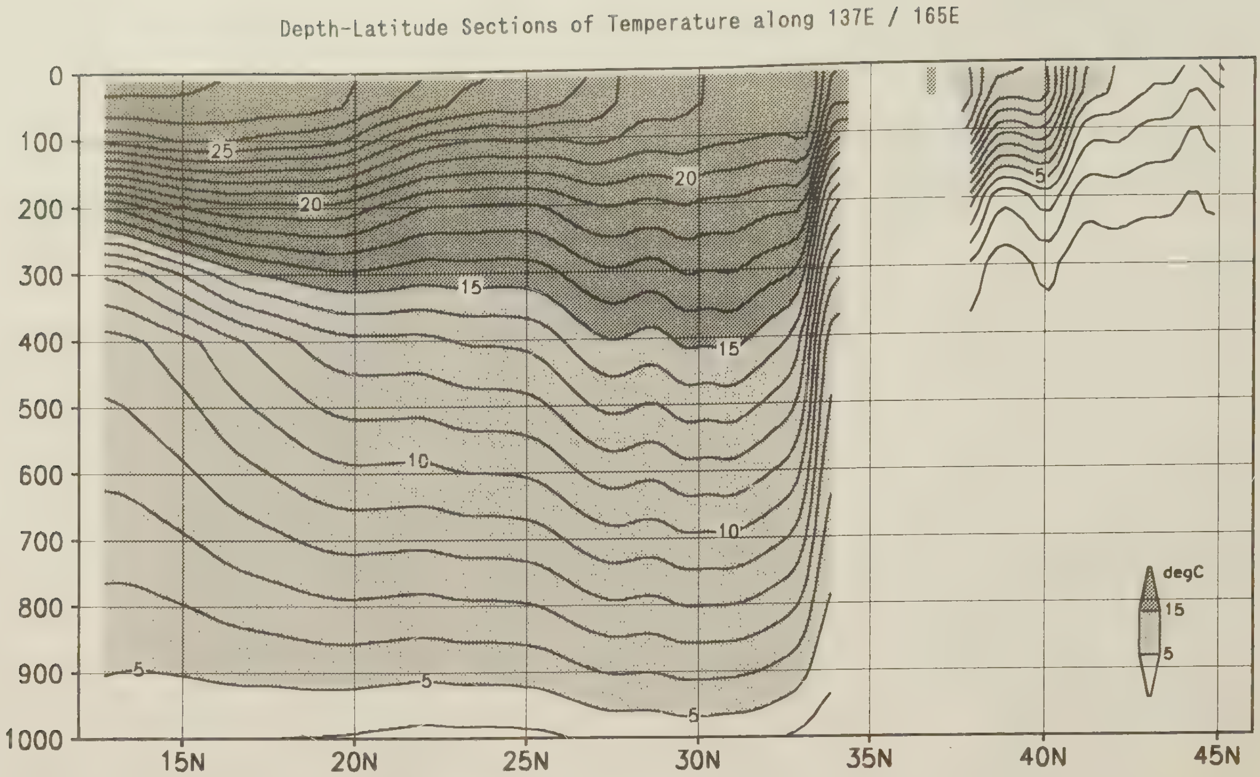
第9図 旬別黒潮流軸図

Fig. 9 Location of the Kuroshio axis



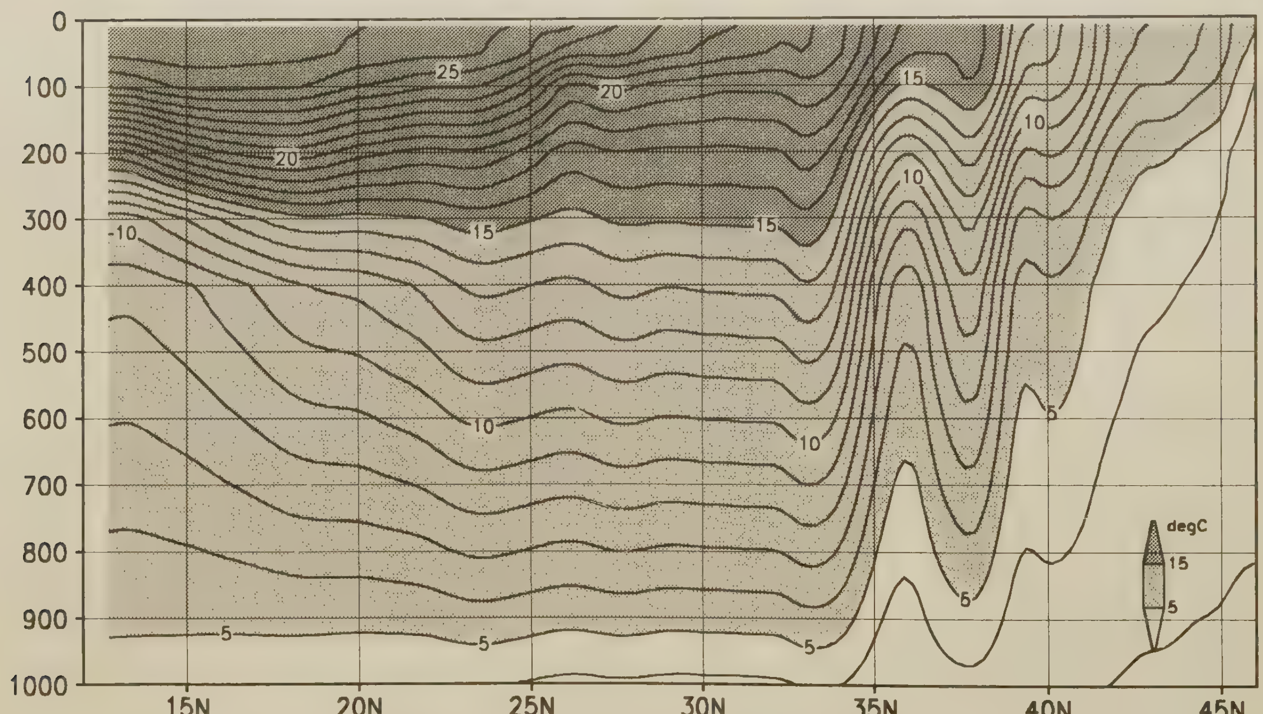
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Fig. 10　Monthly mean sea surface height (top) and current (bottom) in the western North Pacific for December 2002. Contour interval is 10cm (top). (calculated by the Ocean Comprehensive Analysis System)



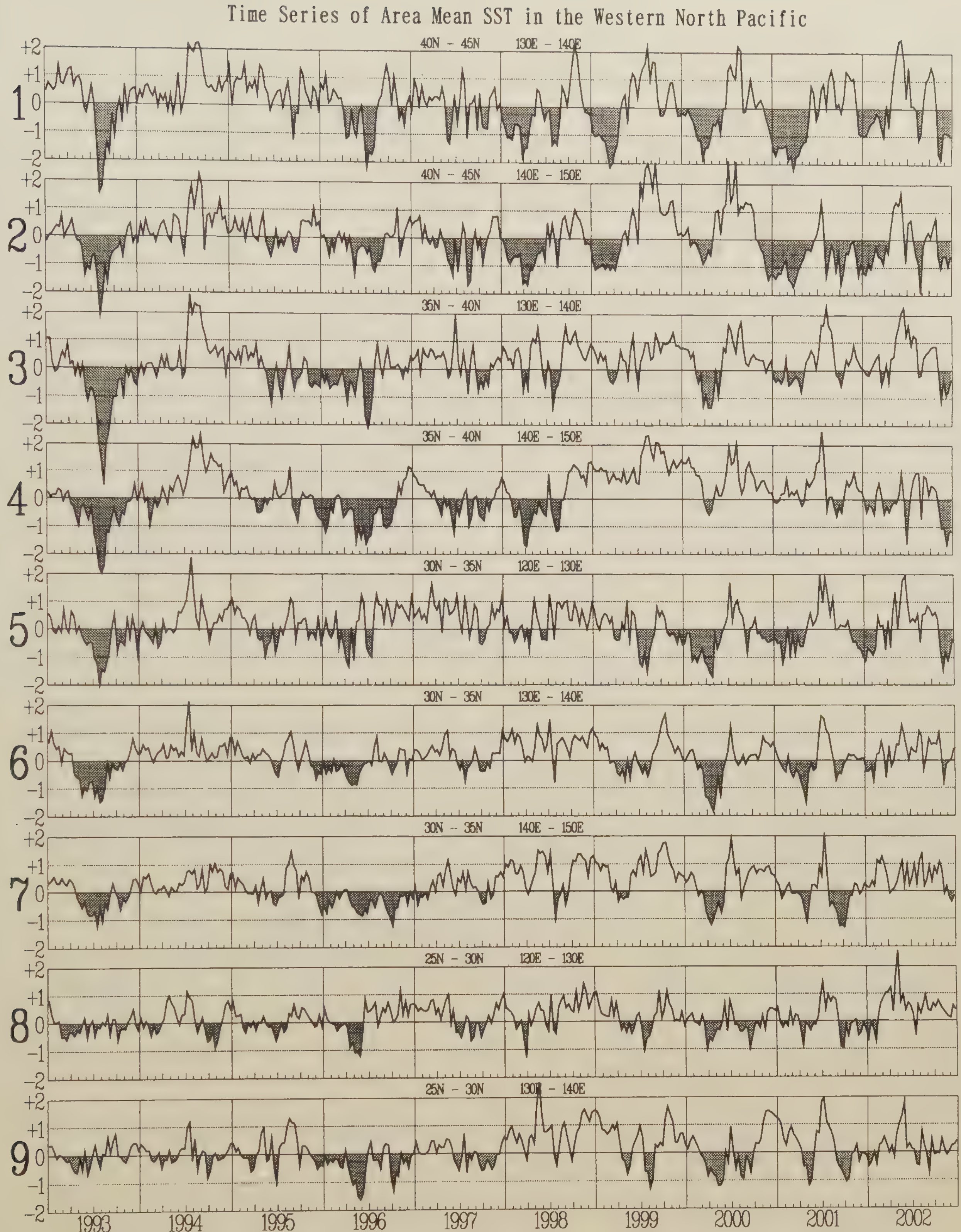
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（海洋総合解析システムによる）

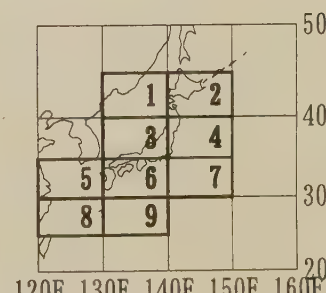
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第 12 図　東経 165° 線に沿う月平均表層水温の鉛直断面図（2002 年 12 月）
（海洋総合解析システムによる）

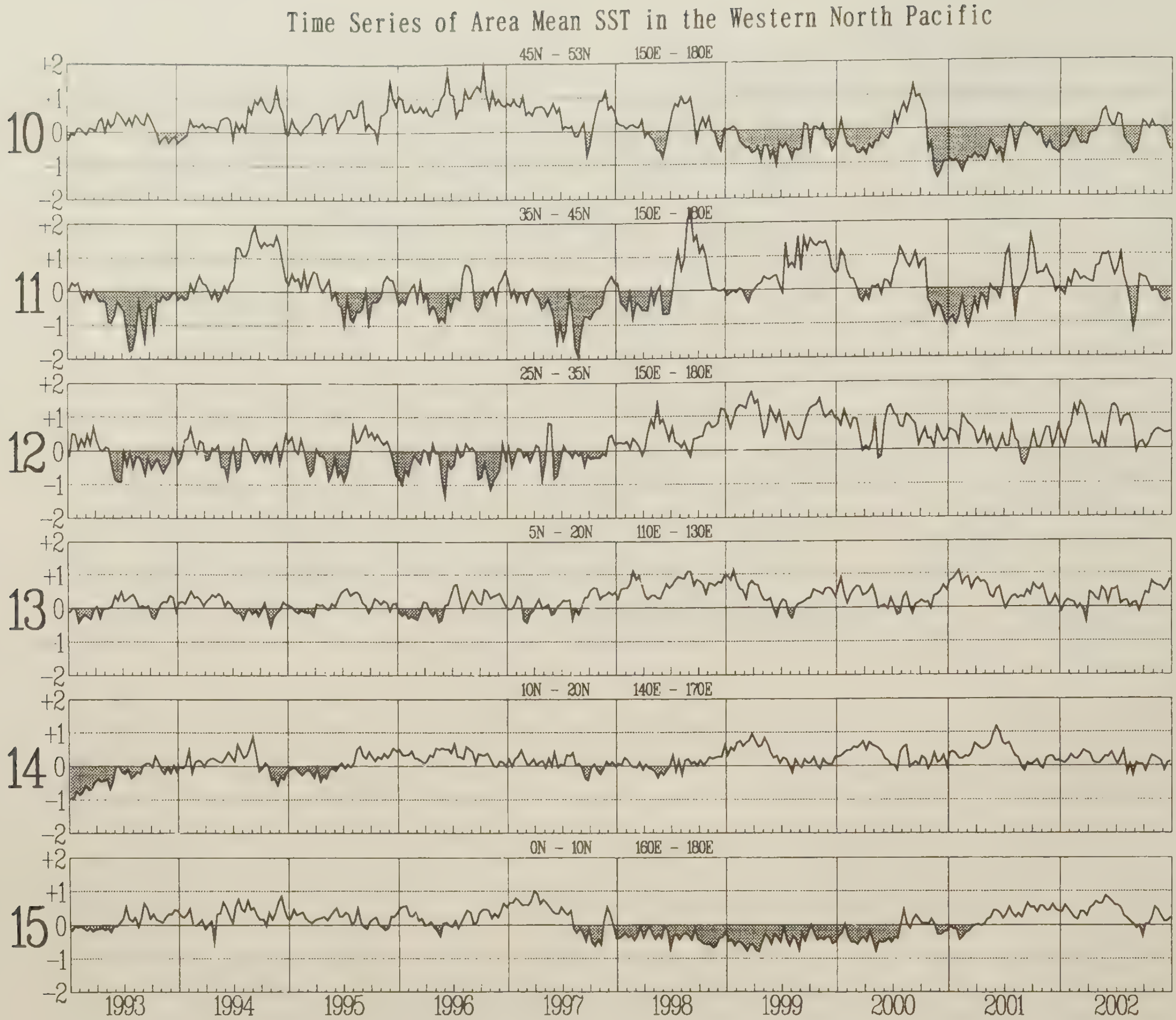
Fig. 12　Vertical cross section of monthly mean temperature along 165 °E for December 2002. Contour interval is 1 ℃. (calculated by the Ocean Comprehensive Analysis System)

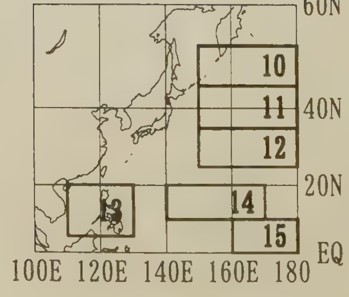




第13図　海域別旬平均海面水温平年偏差時系列図

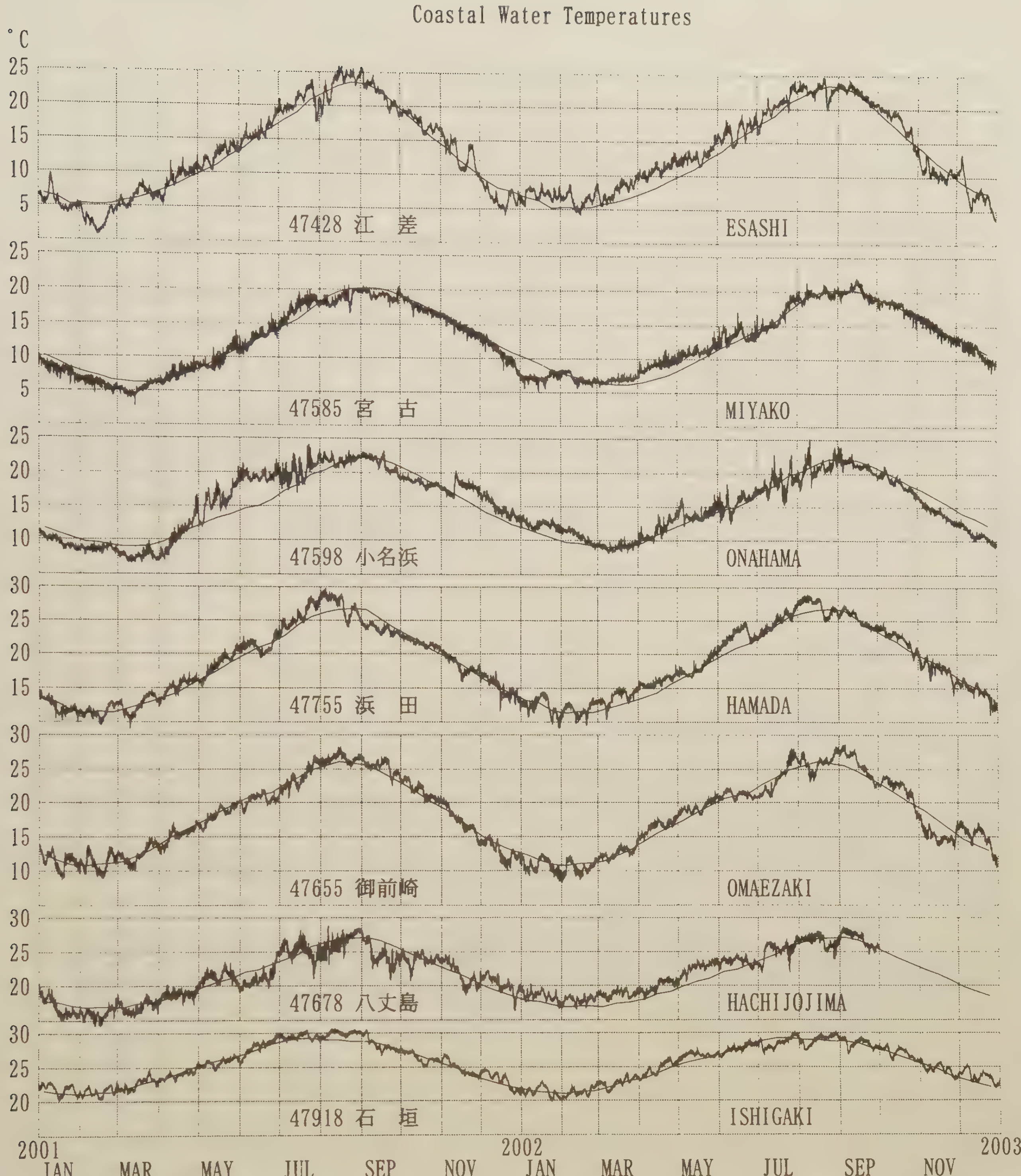
Fig. 13 Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).





第13図　海域別旬平均海面水温平年偏差時系列図（つづき）

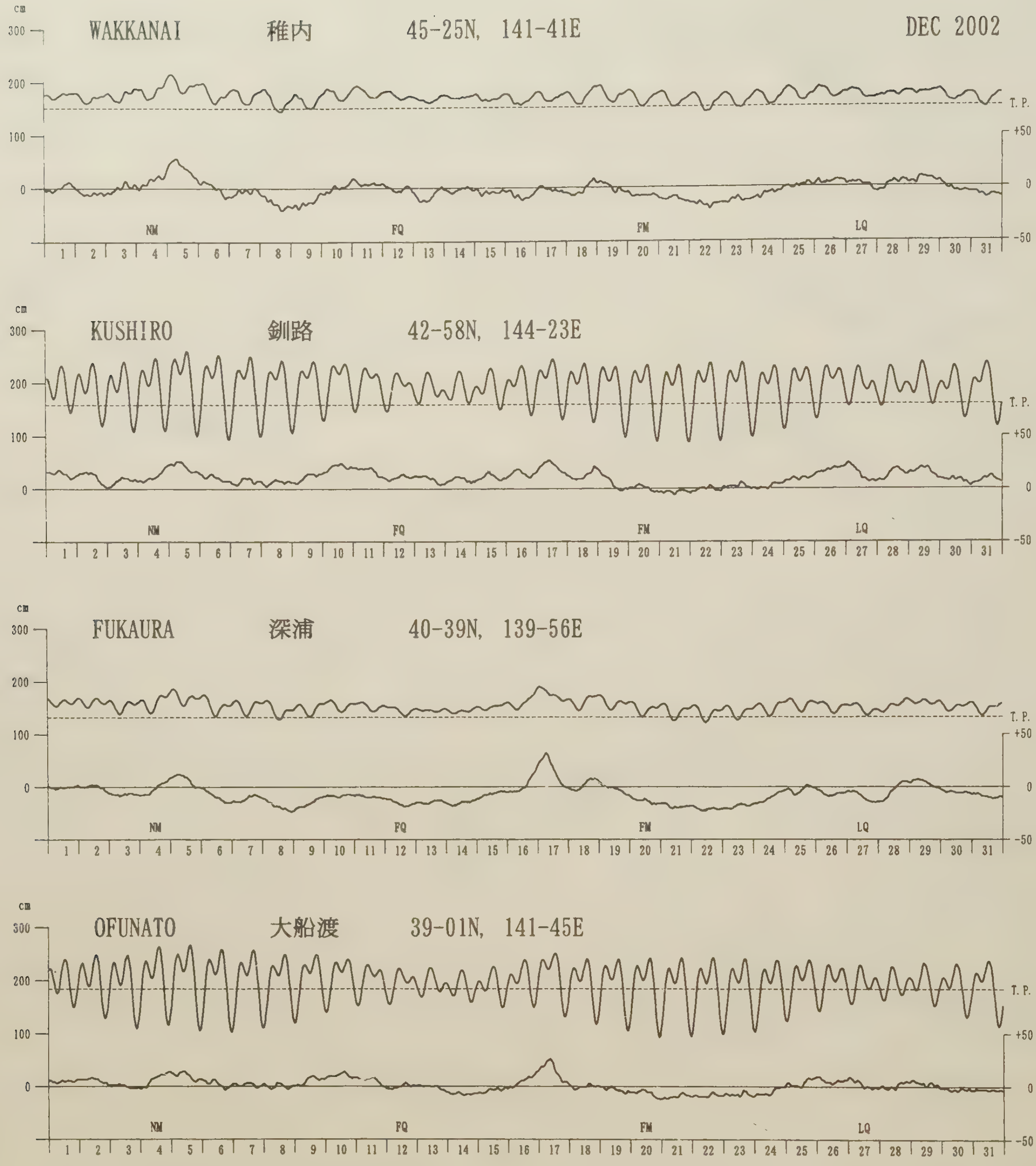
Fig. 13 (continue) Time series of the ten-day mean SST anomalies (°C) in the western North Pacific for the areas shown in the right panel. Negative anomalies are shaded. Anomalies are computed from the JMA climatology (1971-2000).





第14図 沿岸水温時系列図

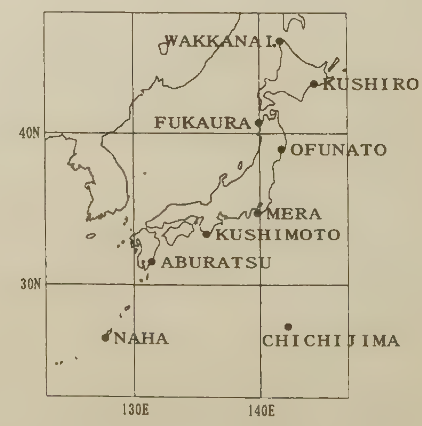
Fig. 14 Time series of hourly coastal water temperatures (°C) measured at 7 coastal stations of the JMA shown in the right panel.
Thin lines show ten-day mean climatology.

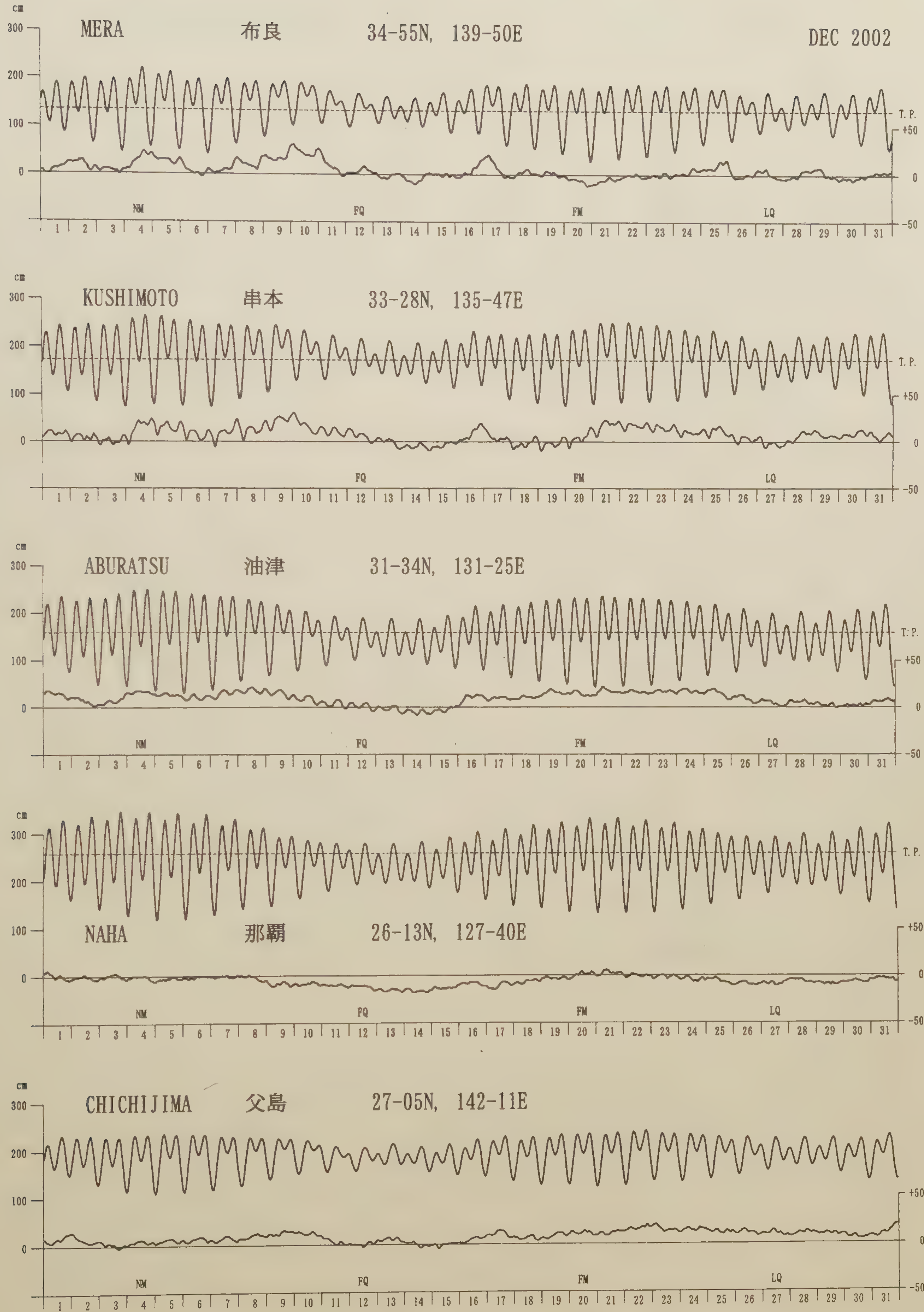


第15図 沿岸潮位時系列図（2002年12月）

Fig. 15 Time series of hourly sea level observation (upper line) and its anomalies (lower line) at 9 stations of the JMA in the right panel.
Short term variations are removed from raw data.

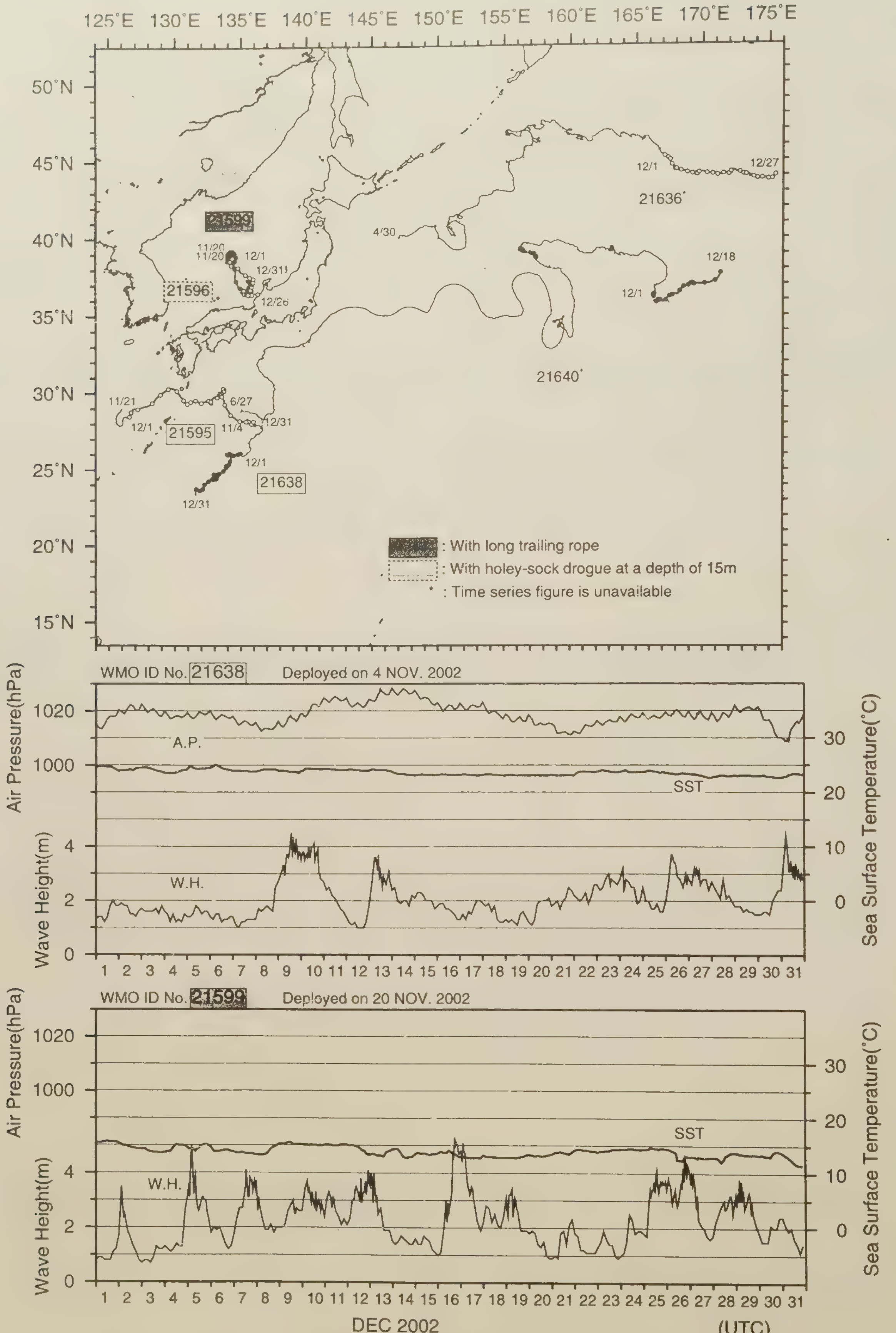
NM: new moon, FQ: first quarter
FM: full moon, LQ: last quarter
T. P. : Mean sea level of Tokyo Bay (Tokyo Peil)





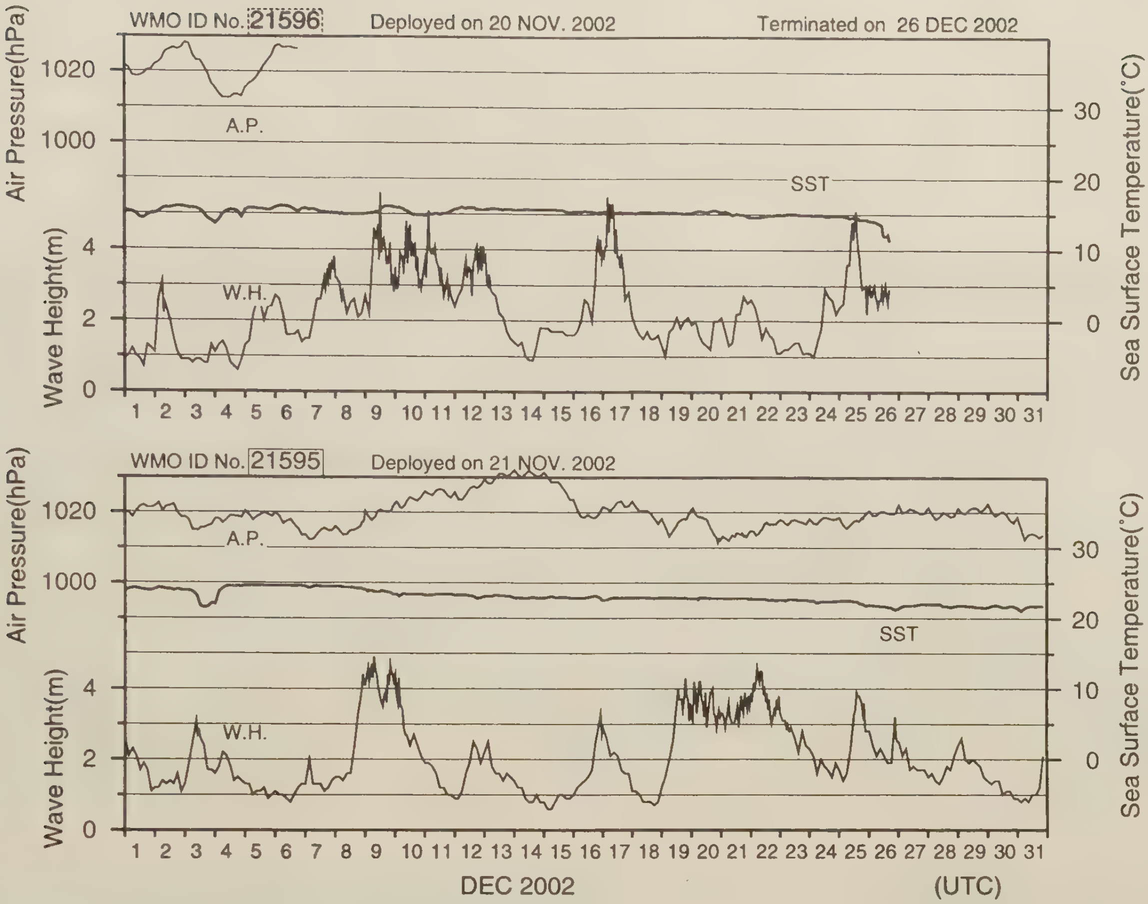
第15図 つづき

Fig. 15 continue



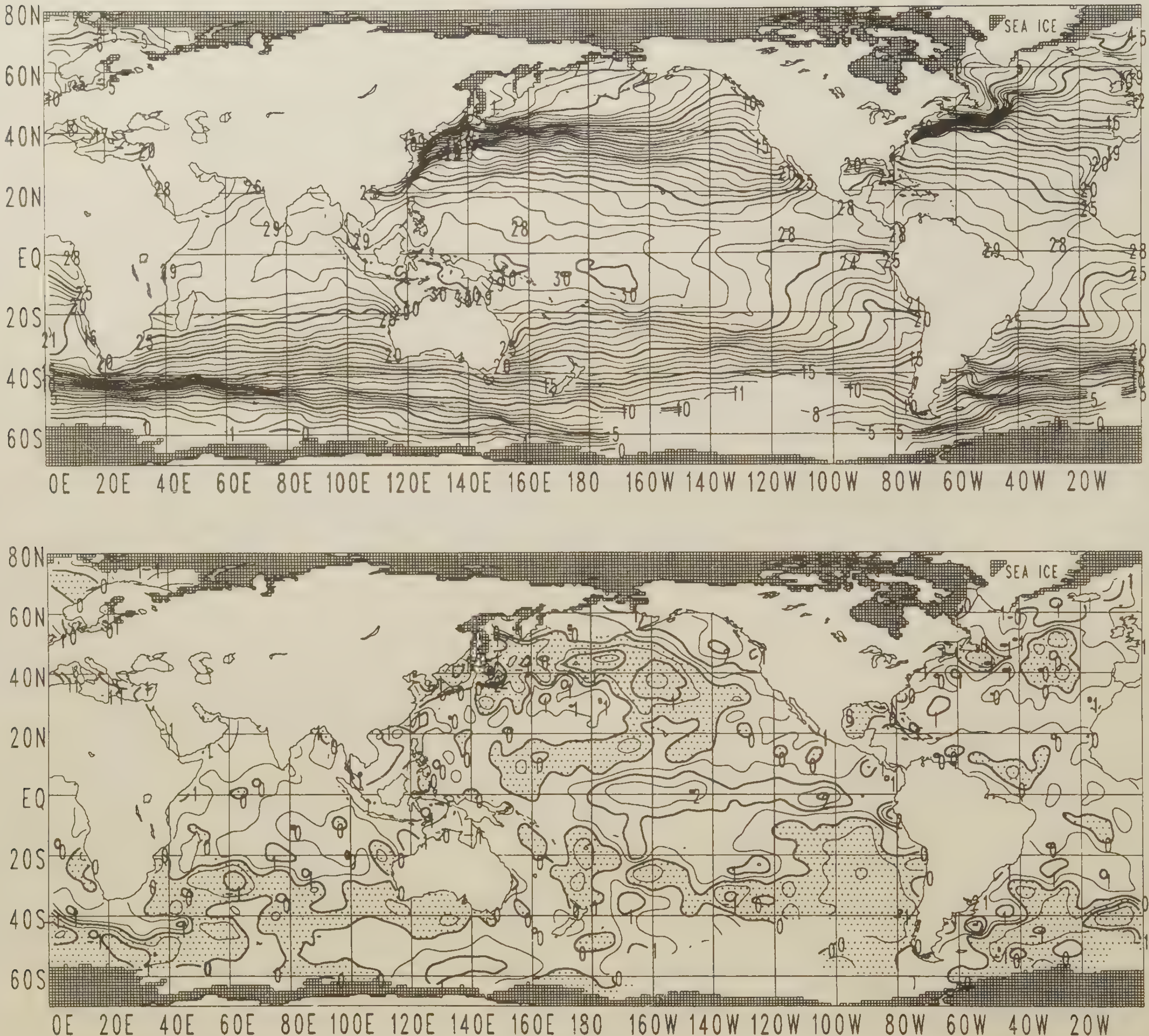
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Fig.16　Time series of JMA drifting buoy observation.
The upper panel shows paths of the buoys. Circles denote the position at 00h UTC everyday.
The lower panel shows time series of observation data.



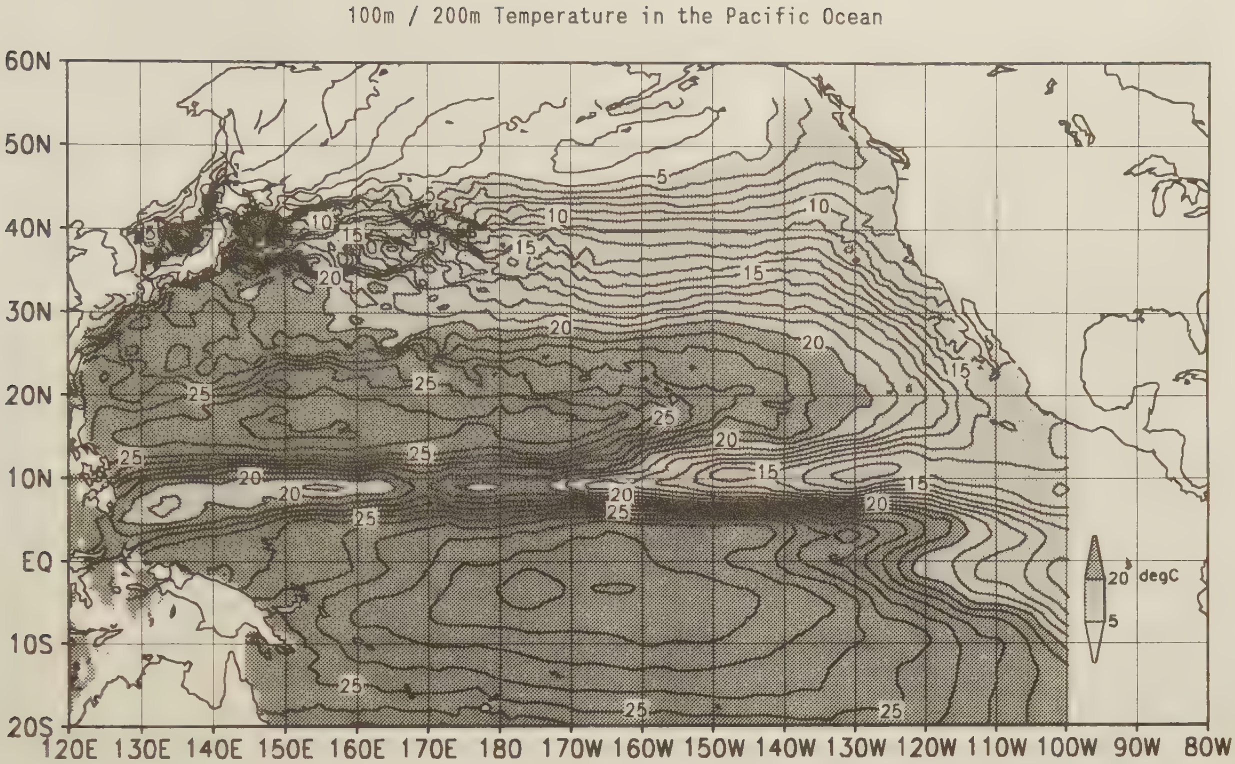
第16図つづき
Fig.16 continue

SST & Anomalies in the Global Ocean



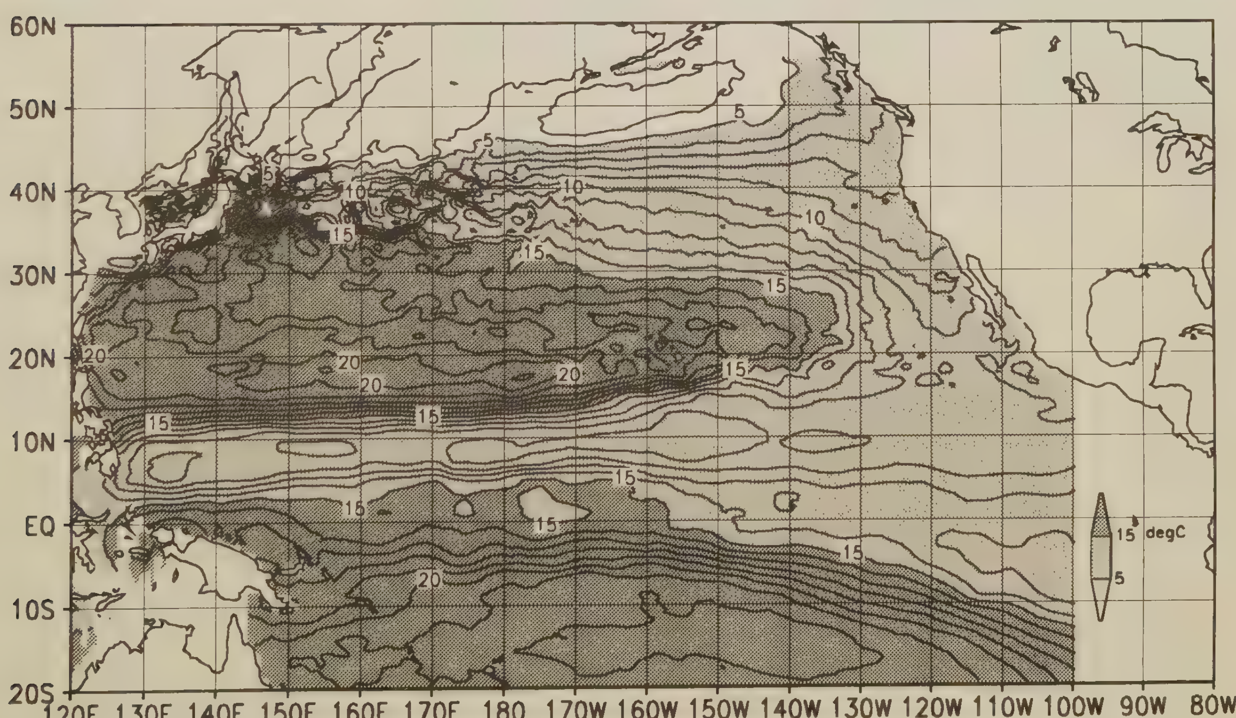
第17図　全球月平均海面水温図（上）及び偏差図（下）（2002年12月）

Fig. 17 Monthly mean SST over the global ocean (top) and anomalies (bottom) for DEC 2002. Anomalies are computed from the JMA climatology (1971-2000). Contour interval is 1°C (top) and additional anomaly contours of ±0.5°C are shown by thin lines. Negative anomalies are spotted. Maximum coverage of sea ice is shaded. Data sources for sea ice are U.S. National Ice Center (polar regions) and JMA (the Sea of Okhotsk).



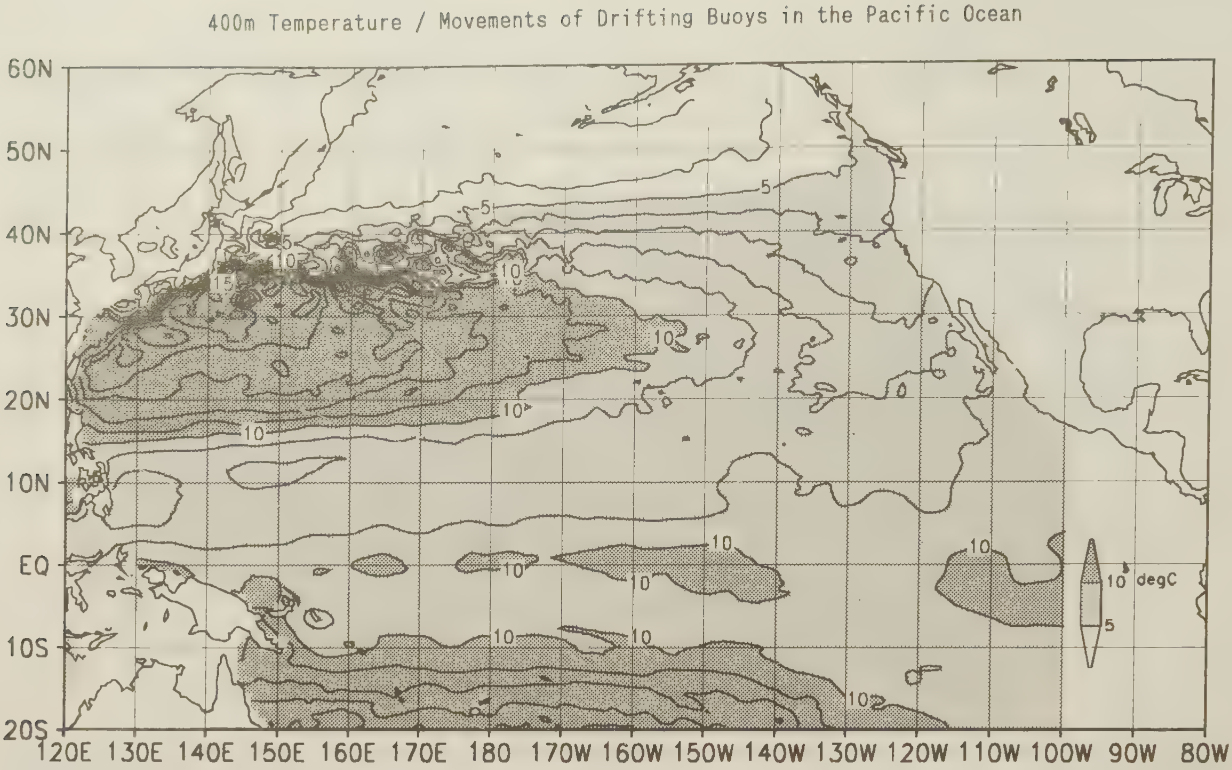
第 18 図　太平洋月平均表層水温図（深さ 100 m）　(2002 年 12 月)
（海洋総合解析システムによる）

Fig. 18　Monthly mean subsurface (100 m) temperature in the Pacific Ocean for December 2002. Contour interval is 1 ℃. (calculated by the Ocean Comprehensive Analysis System)



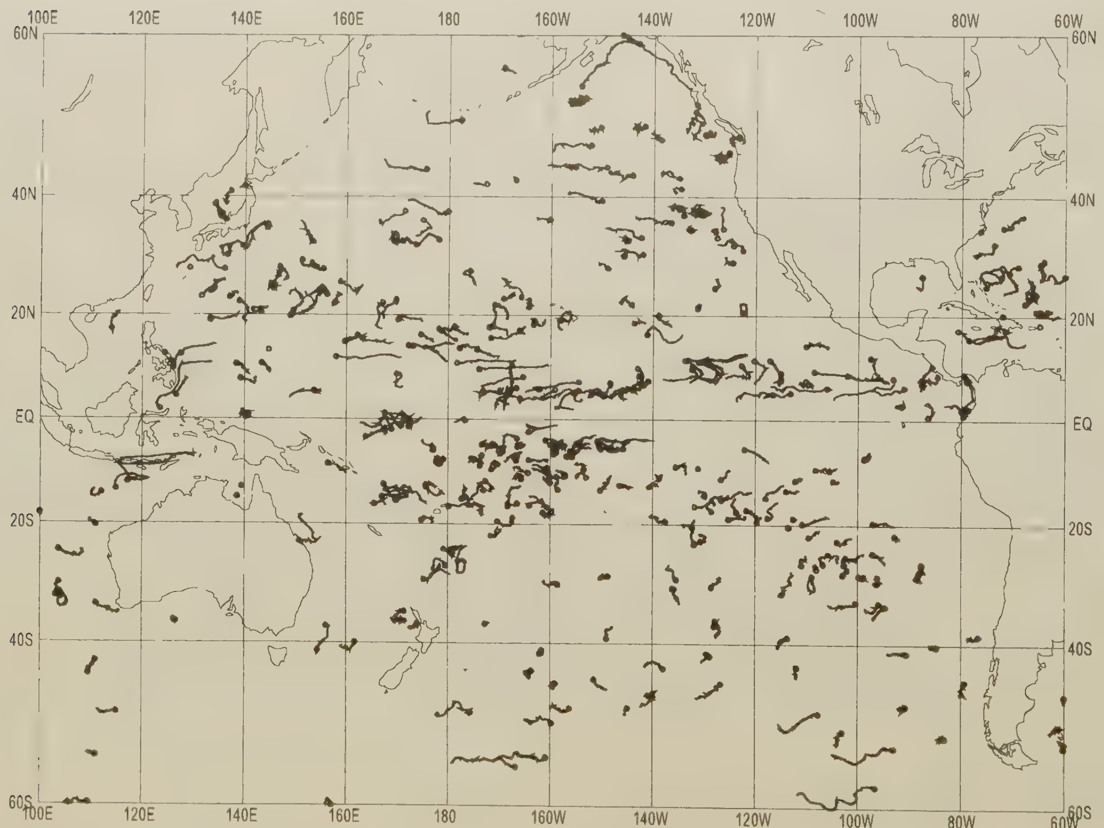
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（海洋総合解析システムによる）

Fig. 19　Monthly mean subsurface (200 m) temperature in the Pacific Ocean for December 2002. Contour interval is 1 ℃. (calculated by the Ocean Comprehensive Analysis System)



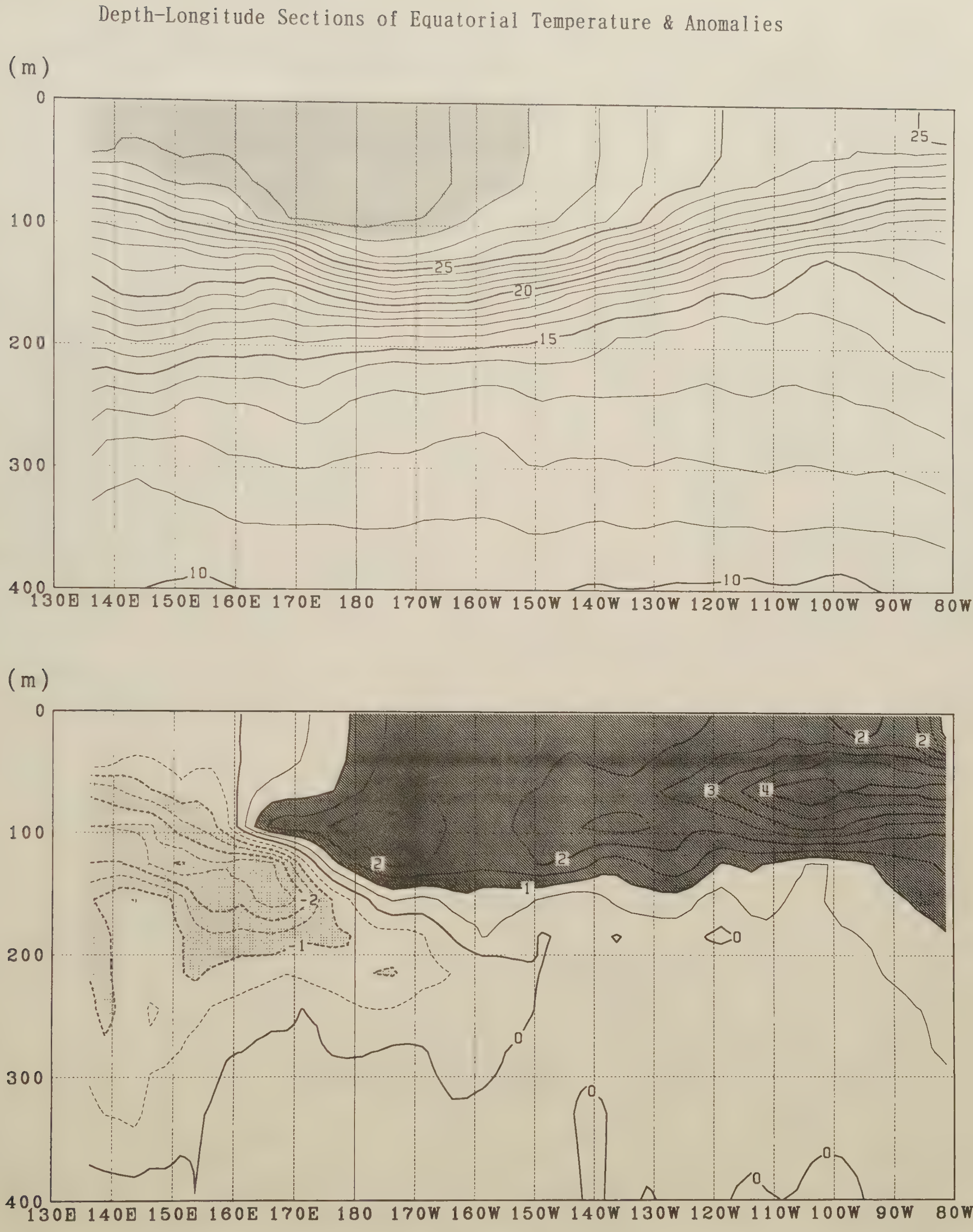
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（海洋総合解析システムによる）

Fig. 20　Monthly mean subsurface (400 m) temperature in the Pacific Ocean for December 2002. Contour interval is 1 ℃. (calculated by the Ocean Comprehensive Analysis System)



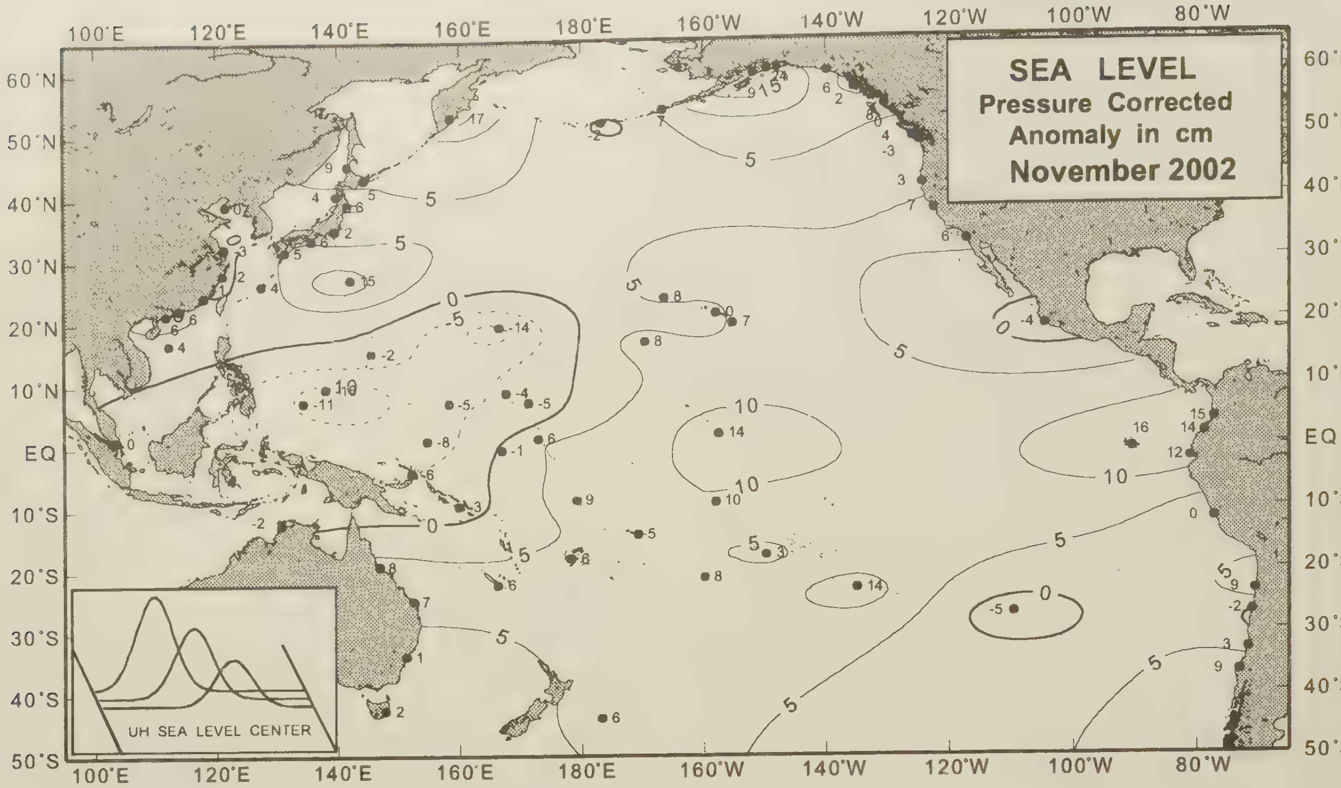
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Fig. 21　Trajectories of drifting buoys in the Pacific Ocean during December 2002. Each track is for one buoy. Small circles represent the last positions for the month.



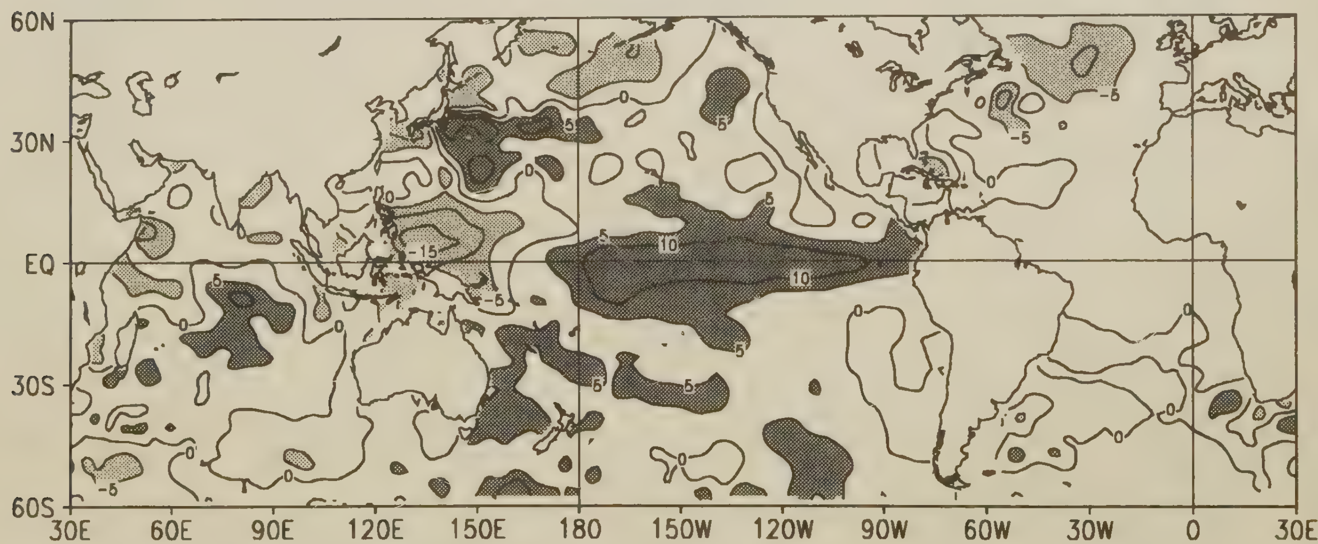
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Fig. 22 Depth-longitude sections of temperature (top) and anomalies (bottom) along the equator in the Pacific Ocean for DEC 2002. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (top) and 0.5°C (bottom). Values greater than 28°C in the top panel are shaded. In the bottom panel, values greater than 1°C are shaded and values less than -1°C are spotted. Anomalies are computed from 1987-2001 base period means.



第 23 図　太平洋月平均海面水位偏差図（2002 年 11 月）

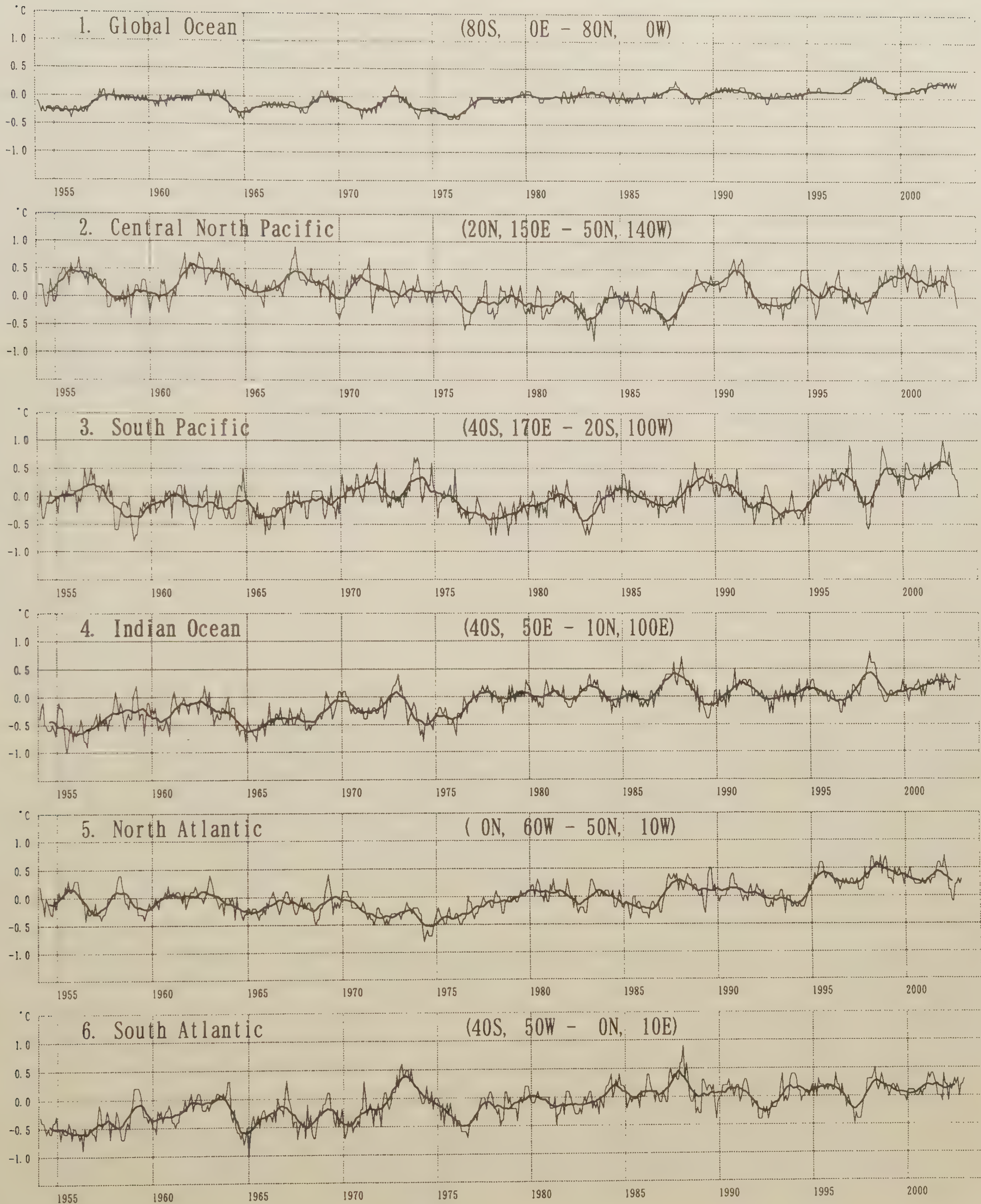
Fig. 23　Monthly sea level anomalies for November 2002 obtained from mean sea level (1975-1995) adjusted for atmospheric pressure. This figure is prepared by the SOC of ISLP-PAC, Department of Oceanography, University of Hawaii.



第 24 図　全球月平均海面高度偏差図（2002 年 11 月）

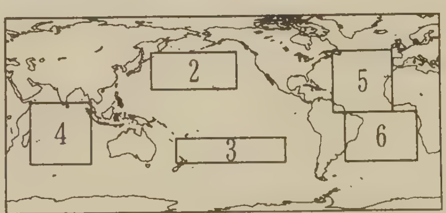
Fig. 24　Monthly sea surface height anomalies in the global ocean derived from the altimeter data of Jason-1 for November 2002. Contour interval is 5 cm. Positive anomalies exceeding +5 cm are shaded and negative anomalies exceeding -5 cm are spotted. Anomalies are computed from 1993-1998 base period means.

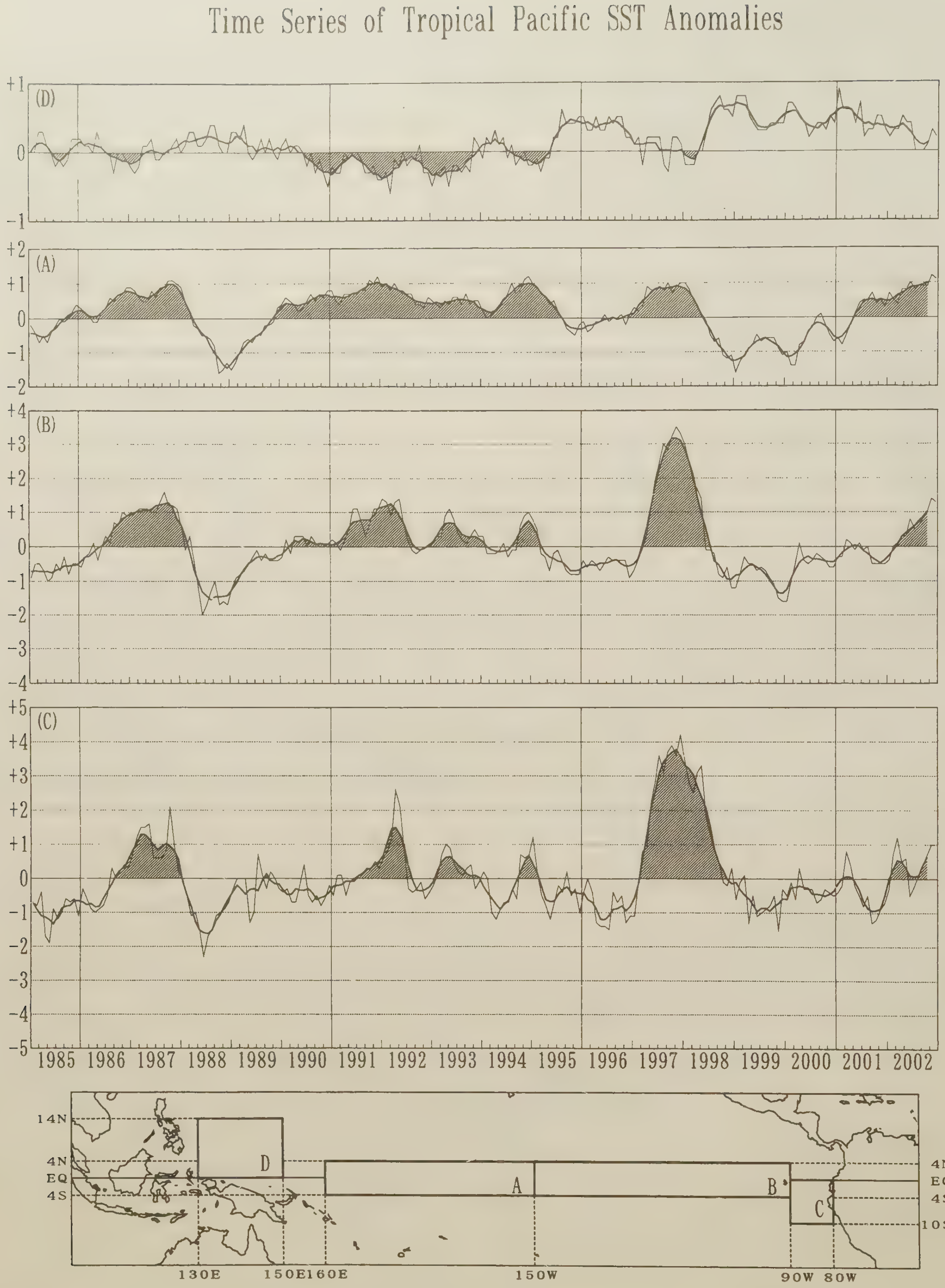
Long-term Variation of Monthly Mean SST Anomalies



第25図 海域平均海面水温偏差の長期変動

Fig. 25 Long-term variations of monthly mean sea surface temperature anomalies (°C) for the areas shown in the right panel. Anomalies are computed from the JMA climatology (1971-2000). Thin lines show the monthly mean and thick lines their 13-month running means.





第26図　太平洋熱帯域の海面水温偏差時系列図

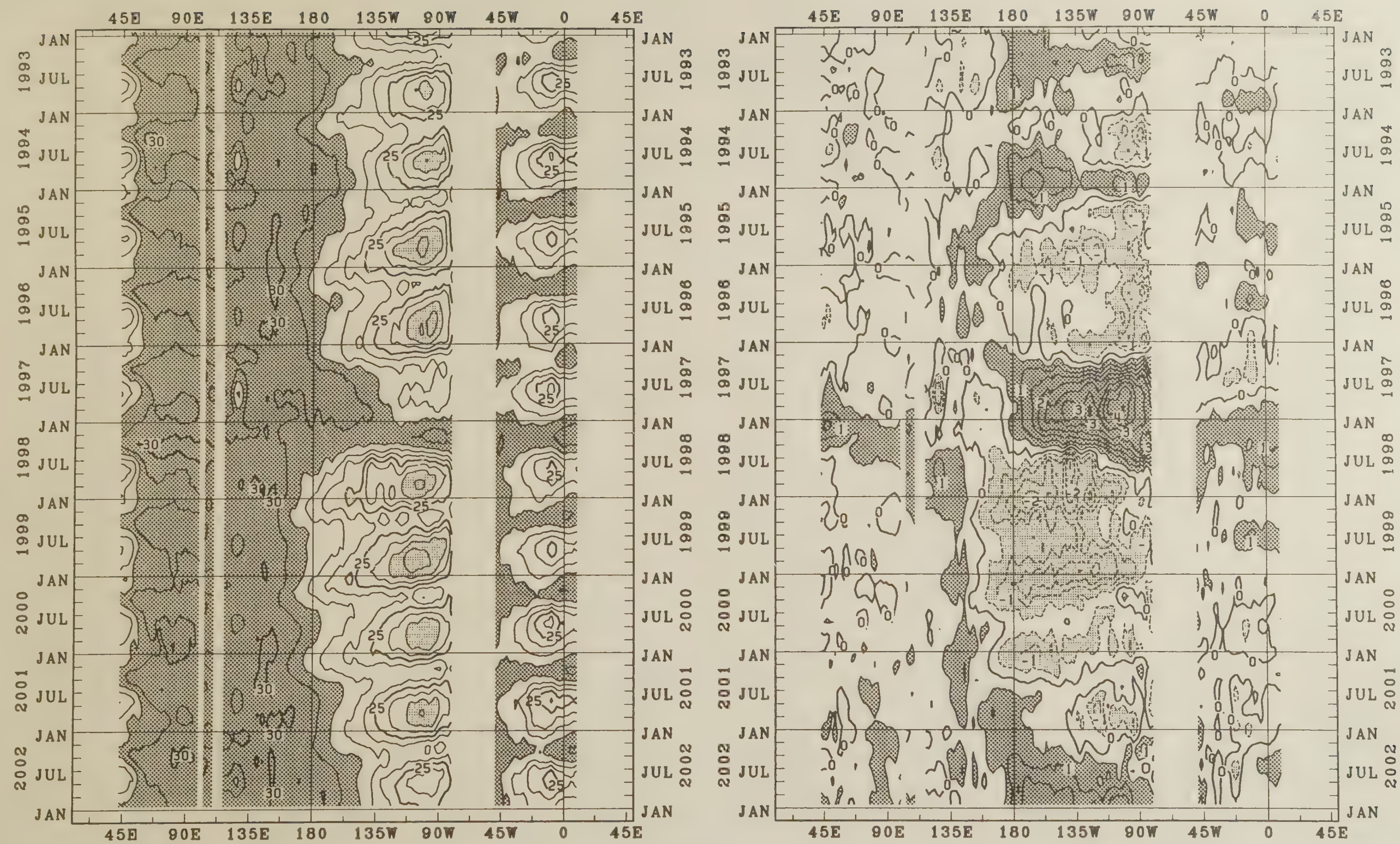
Fig. 26 Time series of monthly mean SST anomalies (°C) in the tropical Pacific Ocean for the areas indicated at the bottom panel.
Thin lines show the monthly means and thick lines their 5-month running means. Positive anomalies (A, B, C) and negative anomalies (D) are shaded. Anomalies are computed from the JMA climatology (1971-2000).

MONTH YEAR	SEA SURFACE TEMPERATURE AND ANOMALY (°C) REGION D 14N-EQ 130E-150E		REGION A 4N-4S 160E-150W		REGION B 4N-4S 150W-90W		REGION C EQ-10S 90W-80W		SOI	SEA LEVEL PRESSURE ANOMALY (hPa) TAHITI 17-33S 149-37W	DARWIN 12-24S 130-52E
JAN 00	29.2	0.7	27.0	-1.0	23.8	-1.6	24.0	-0.5	0.5	1.2	0.1
FEB 00	29.0	0.7	26.6	-1.4	25.3	-1.0	25.9	-0.1	1.1	2.6	-0.3
MAR 00	29.1	0.6	26.7	-1.4	26.6	-0.5	25.7	-0.6	1.1	1.6	-0.6
APR 00	29.3	0.5	27.4	-0.8	27.3	0.1	25.7	0.3	1.3	1.0	-1.1
MAY 00	29.7	0.4	27.9	-0.7	26.5	-0.4	24.0	-0.3	0.3	0.8	0.4
JUN 00	29.6	0.2	28.1	-0.4	25.7	-0.5	22.6	-0.3	-0.3	0.3	0.8
JUL 00	29.6	0.3	28.2	-0.3	25.0	-0.4	21.6	-0.3	-0.3	-0.5	0.0
AUG 00	29.6	0.4	28.4	0.0	24.5	-0.2	20.2	-0.7	0.6	0.2	-0.9
SEP 00	29.7	0.4	28.5	0.1	24.4	-0.3	19.9	-0.6	0.9	1.5	-0.2
OCT 00	29.7	0.3	28.2	-0.2	24.3	-0.4	20.6	-0.3	1.0	0.3	-1.5
NOV 00	29.8	0.5	27.9	-0.5	24.1	-0.6	21.4	-0.4	1.8	1.2	-2.3
DEC 00	29.4	0.4	27.5	-0.7	24.4	-0.6	22.4	-0.5	0.9	-0.9	-2.6
JAN 01	29.4	0.9	27.4	-0.6	25.1	-0.3	24.1	-0.4	0.8	2.5	0.6
FEB 01	28.9	0.6	27.2	-0.8	26.0	-0.3	25.8	-0.2	1.0	-0.4	-3.2
MAR 01	29.1	0.6	27.6	-0.5	27.3	0.2	27.1	0.8	0.8	1.3	-0.2
APR 01	29.4	0.6	28.0	-0.2	27.3	0.1	25.8	0.4	0.1	-0.1	-0.3
MAY 01	29.7	0.4	28.7	0.1	26.8	-0.1	24.1	-0.2	-0.7	-0.2	0.9
JUN 01	30.1	0.7	28.9	0.4	26.3	0.1	22.4	-0.5	0.2	-0.2	-0.5
JUL 01	29.5	0.2	29.0	0.5	25.3	-0.1	21.1	-0.8	-0.2	-0.1	0.3
AUG 01	29.5	0.3	28.9	0.5	24.7	0.0	20.4	-0.5	-0.7	-0.9	0.1
SEP 01	29.6	0.3	29.1	0.7	24.2	-0.5	19.2	-1.3	0.1	-0.2	-0.4
OCT 01	29.9	0.5	28.8	0.4	24.2	-0.5	19.7	-1.2	-0.1	-0.9	-0.9
NOV 01	29.8	0.5	28.9	0.5	24.2	-0.5	20.9	-0.9	0.6	0.7	-0.4
DEC 01	29.3	0.3	28.5	0.3	24.5	-0.5	22.2	-0.7	-0.8	-1.2	0.3
JAN 02	28.7	0.2	28.7	0.7	25.0	-0.4	24.2	-0.3	0.3	1.3	0.7
FEB 02	28.6	0.3	28.5	0.5	26.3	0.0	26.7	0.7	0.7	1.5	-0.2
MAR 02	28.8	0.3	28.5	0.4	27.2	0.1	27.5	1.2	-0.2	0.4	1.0
APR 02	29.3	0.5	29.0	0.8	27.5	0.3	25.9	0.5	-0.1	0.1	0.3
MAY 02	29.7	0.4	29.4	0.8	27.2	0.3	24.9	0.6	-1.3	-1.1	0.7
JUN 02	29.8	0.4	29.5	1.0	27.0	0.8	22.4	-0.5	-0.4	-0.2	0.4
JUL 02	29.3	0.0	29.3	0.8	25.9	0.5	21.7	-0.2	-0.7	0.5	1.6
AUG 02	29.2	0.0	29.3	0.9	25.3	0.6	21.0	0.1	-1.2	-1.4	0.5
SEP 02	29.3	0.0	29.3	0.9	25.5	0.8	20.9	0.4	-0.5	-0.3	0.8
OCT 02	29.5	0.1	29.3	0.9	25.7	1.0	21.6	0.7	-0.5	-1.0	-0.3
NOV 02	29.6	0.3	29.6	1.2	26.1	1.4	22.8	1.0	-0.4	0.1	1.0
DEC 02	29.2	0.2	29.3	1.1	26.3	1.3	23.9	1.0	-1.0	-0.1	1.7

第1表　太平洋熱帯域の大気及び海洋の監視指数

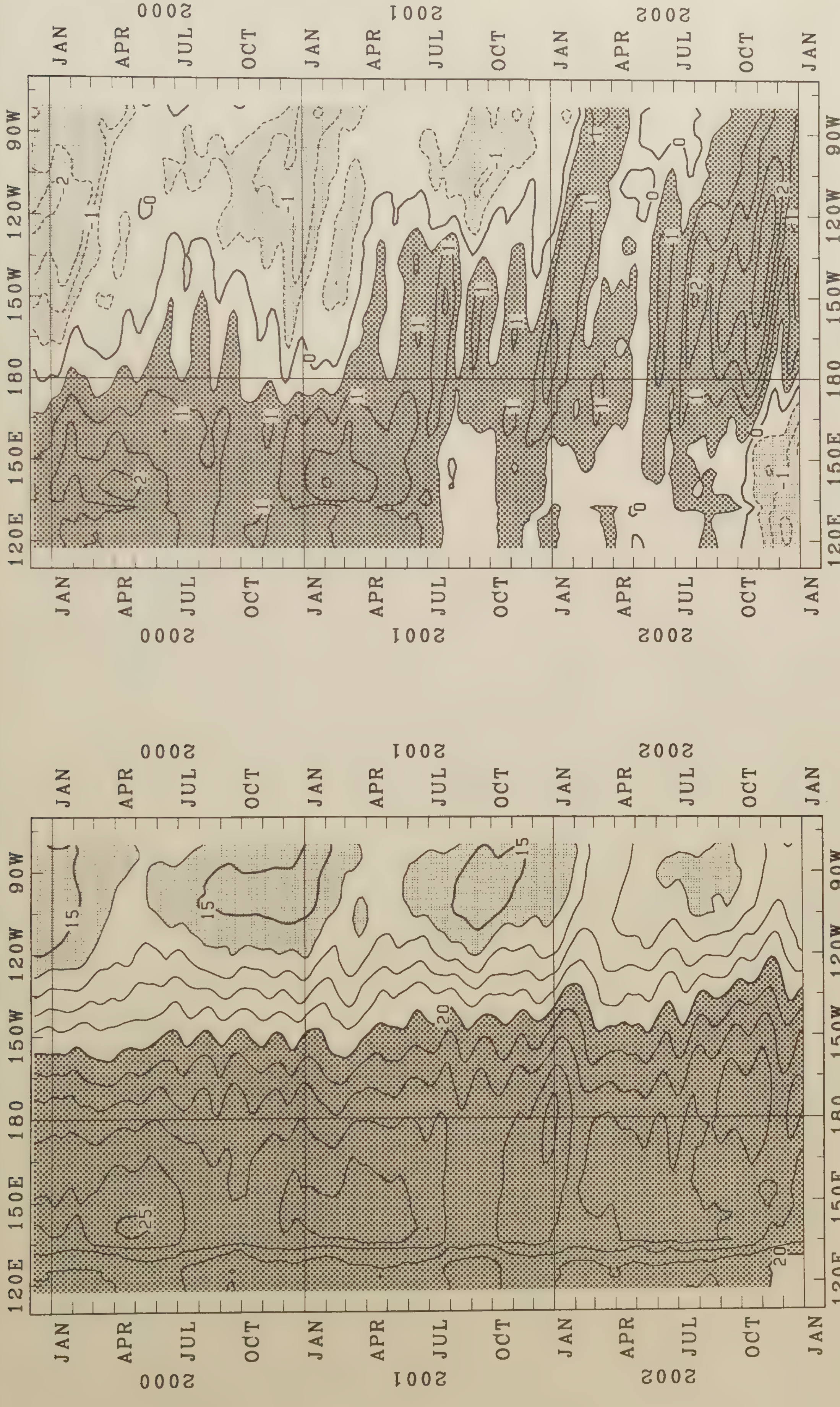
Table 1 Atmospheric and oceanic monitoring indices in the tropical Pacific Ocean

Time-Longitude Section of SST & Anomalies



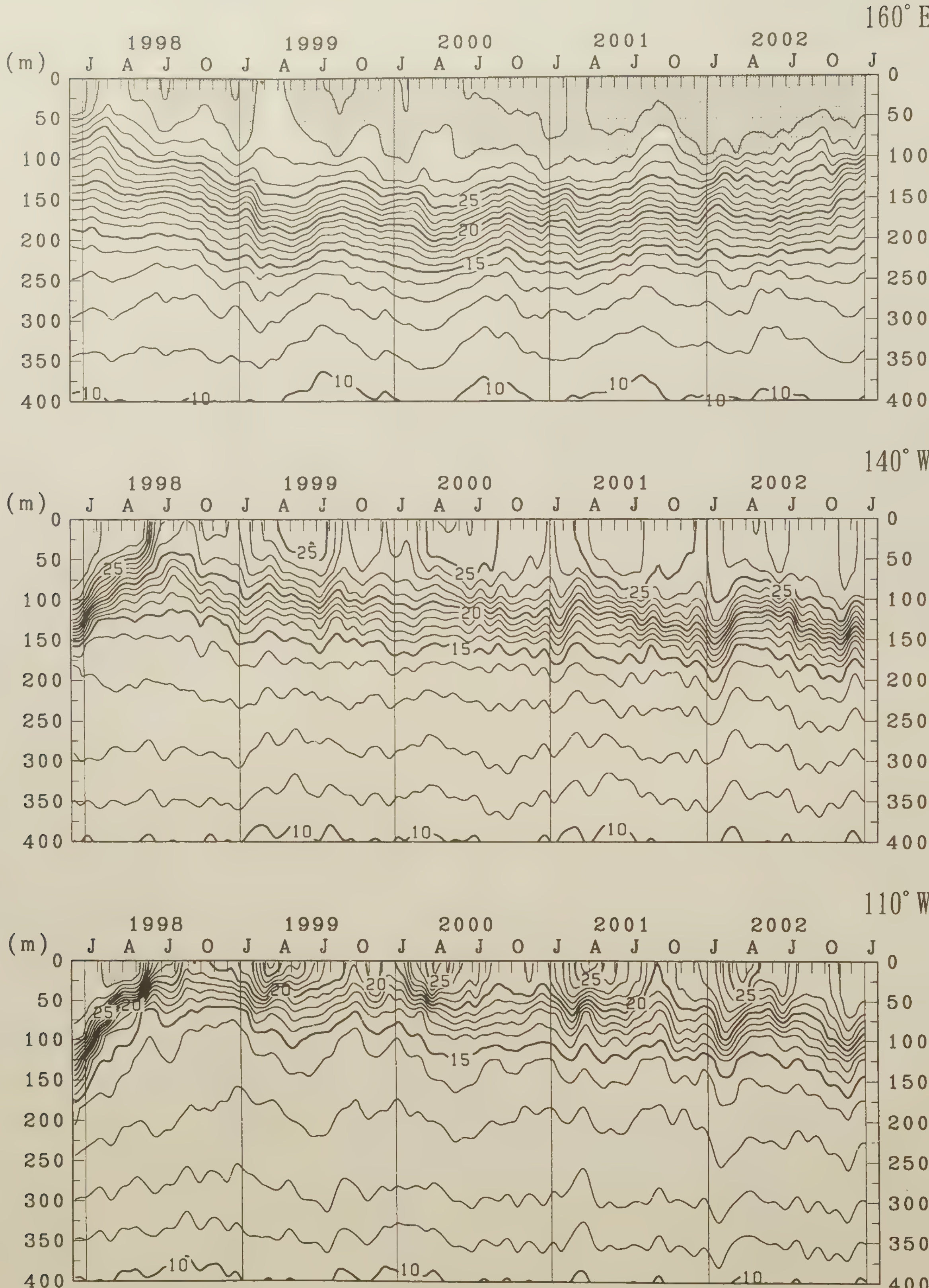
第 27 図　赤道に沿った海面水温（左）および偏差（右）の時間-経度断面図

Fig. 27　Time-longitude sections of SSTs (left) and anomalies (right) along the equator (2 °N-2 °S) in the global ocean. Contour interval is 1 ℃ (left) and 0.5 ℃ (right). Values greater than 28 ℃ are shaded and values less than 23 ℃ are spotted in the left panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1971-2000 base period means.



第28図　太平洋の赤道に沿う海洋表層の貯熱量（左）及び偏差（右）の時間－経度断面図

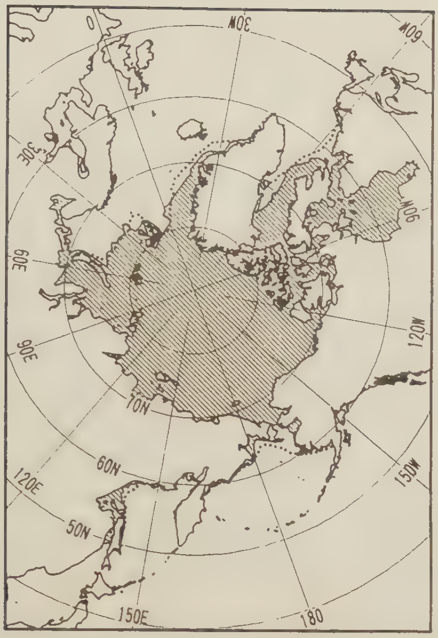
Fig. 28 Time-longitude sections of ocean heat content in the upper 260 m along the equator (left) and anomalies (right) in the Pacific Ocean. Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C (left) and 0.5°C (right). Values greater than 20°C are shaded and values less than 16°C are spotted in the left panel. Dashed contours indicate negative anomalies in the right panel. Anomalies are computed from 1987-2001 base period means.



第29図　太平洋赤道域の表層水温の時間－深度断面図
（上：西部、中：中部、下：東部）

Fig. 29 Time-depth sections of equatorial subsurface temperature for the western Pacific (top, 160°E), the central Pacific (middle, 140°W) and the eastern Pacific (bottom, 110°W). Data are derived from the Ocean Data Assimilation System of JMA. Contour interval is 1°C. Values greater than 28°C are shaded.

Sea Ice

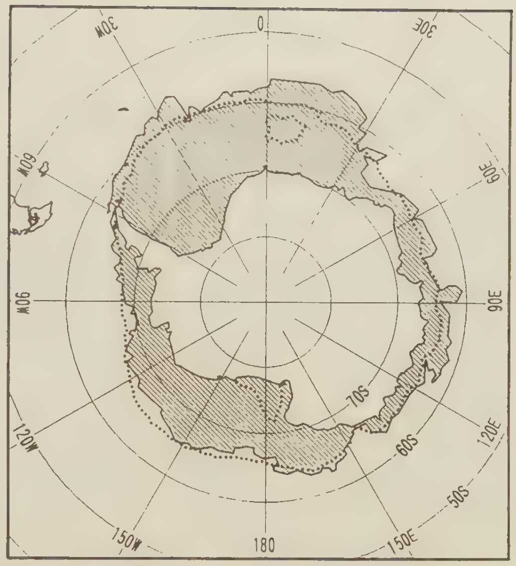


第30-1図　北極域の海氷図（2002年12月13日）

Fig.30-1 Sea ice chart in the Arctic on 13 Dec. 2002.

The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1972 through 1990.

The data source is the National Ice Center (USA).

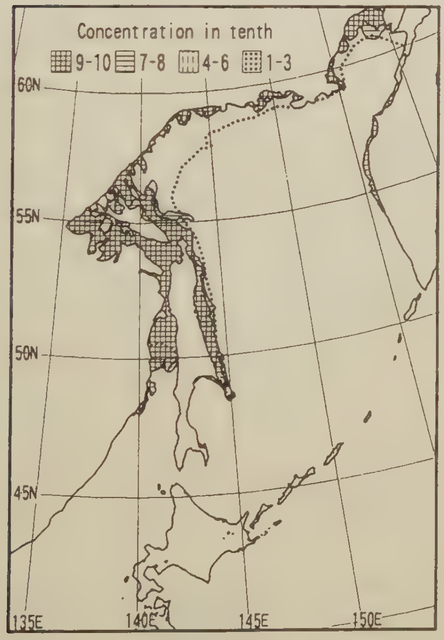


第30-2図　南極域の海氷図（2002年12月12日）

Fig.30-2 Sea ice chart in the Antarctic on 12 Dec. 2002.

The shaded area represents the sea ice extent. The dotted line denotes the mean ice edge averaged for the period from 1973 through 1990.

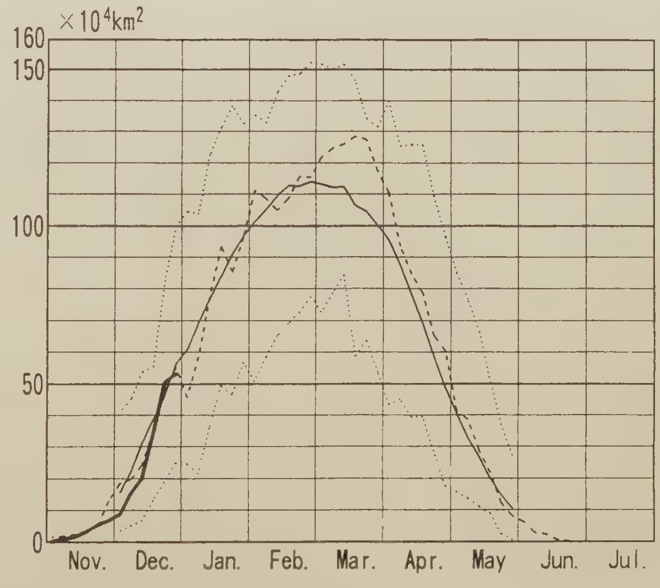
The data source is the National Ice Center (USA).



第30-3図　オホーツク海の海氷図（2002年12月15日）

Fig.30-3 Sea ice chart in the Sea of Okhotsk on 15 Dec. 2002.

The dotted line denotes the mean ice edge averaged for the period from 1971 through 2000.



第30-4図　オホーツク海の海氷域面積

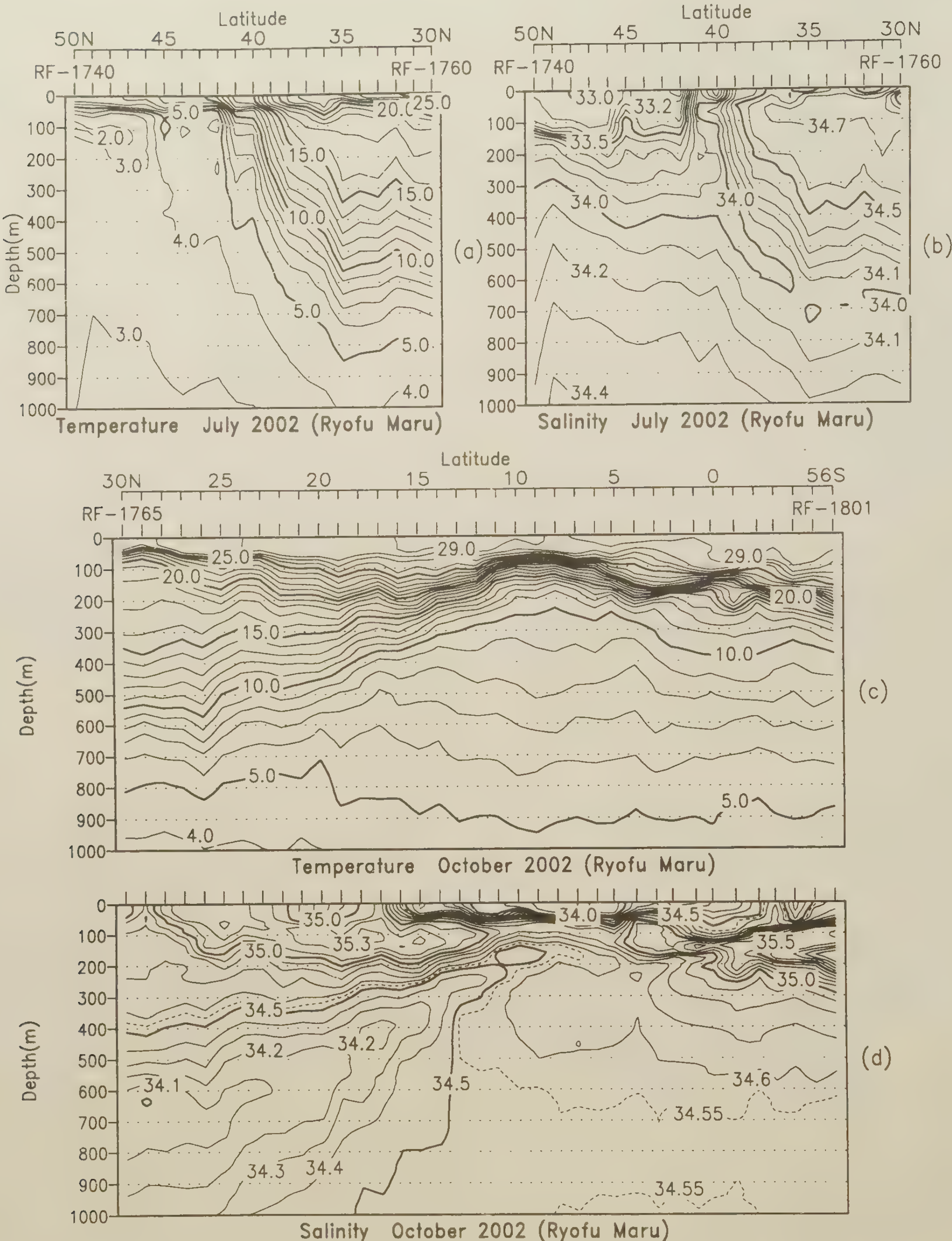
Fig.30-4 Time-series of 5-day sea ice area in the Sea of Okhotsk.

━━━━ : current season (2002/2003)

──── : mean extent (1971-2000)

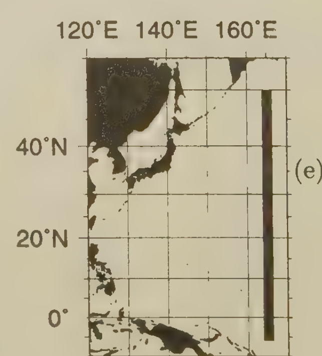
.... : maximum or minimum extent (1971-2002)

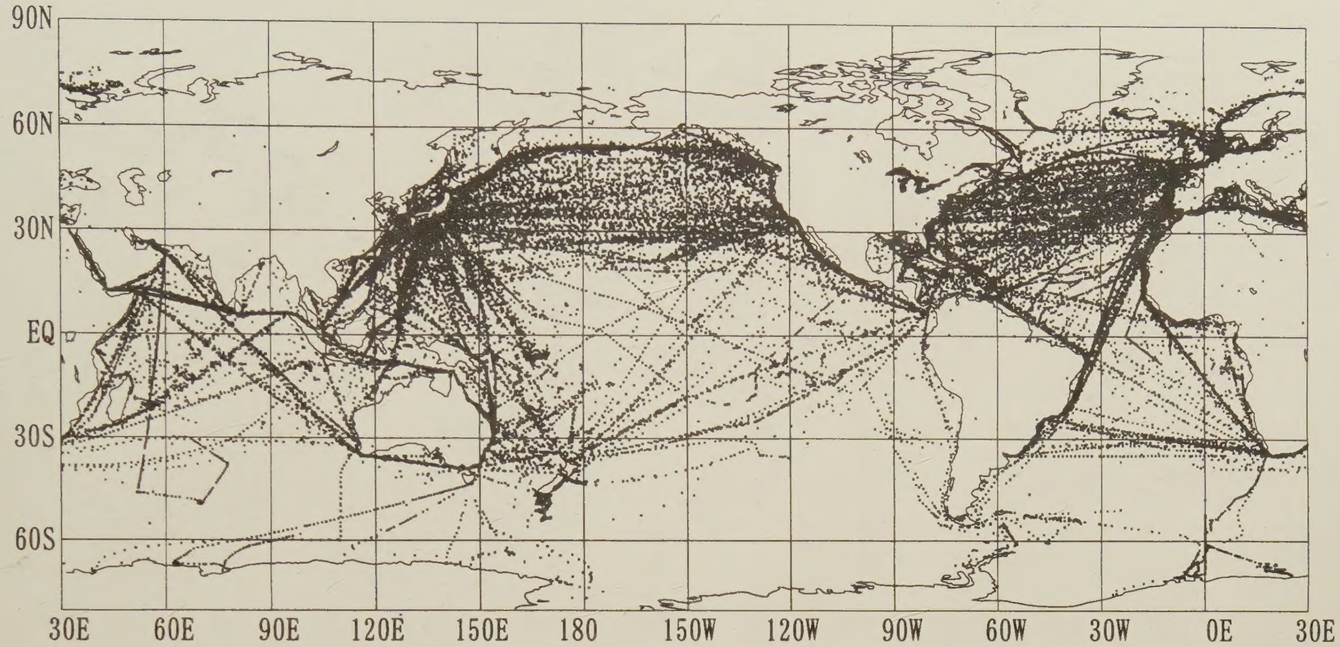
- - - - - - - : last season (2001/2002)



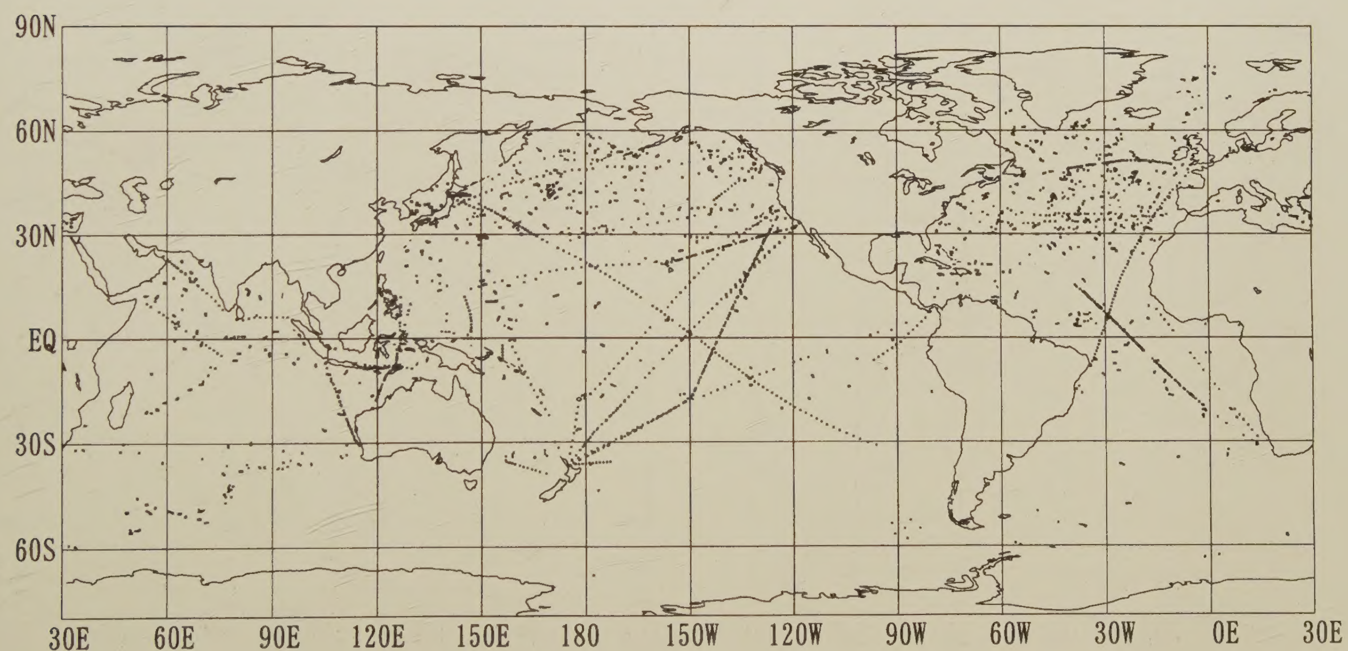
第 31 図 気象庁凌風丸による東経 165 度に沿った鉛直断面図. (a) 水温 (2002 年 7 月), (b) 塩分 (2002 年 7 月), (c) 水温 (2002 年 10 月), (d) 塩分 (2002 年 10 月), (e) 観測位置図.

Fig. 31 Vertical sections along 165°E by R/V Ryofu Maru of JMA. (a) Water temperature observed in July 2002, (b) Salinity observed in July 2002, (c) Water temperature observed in October 2002, (d) Salinity observed in October 2002, (e) Location of observations along 165°E.





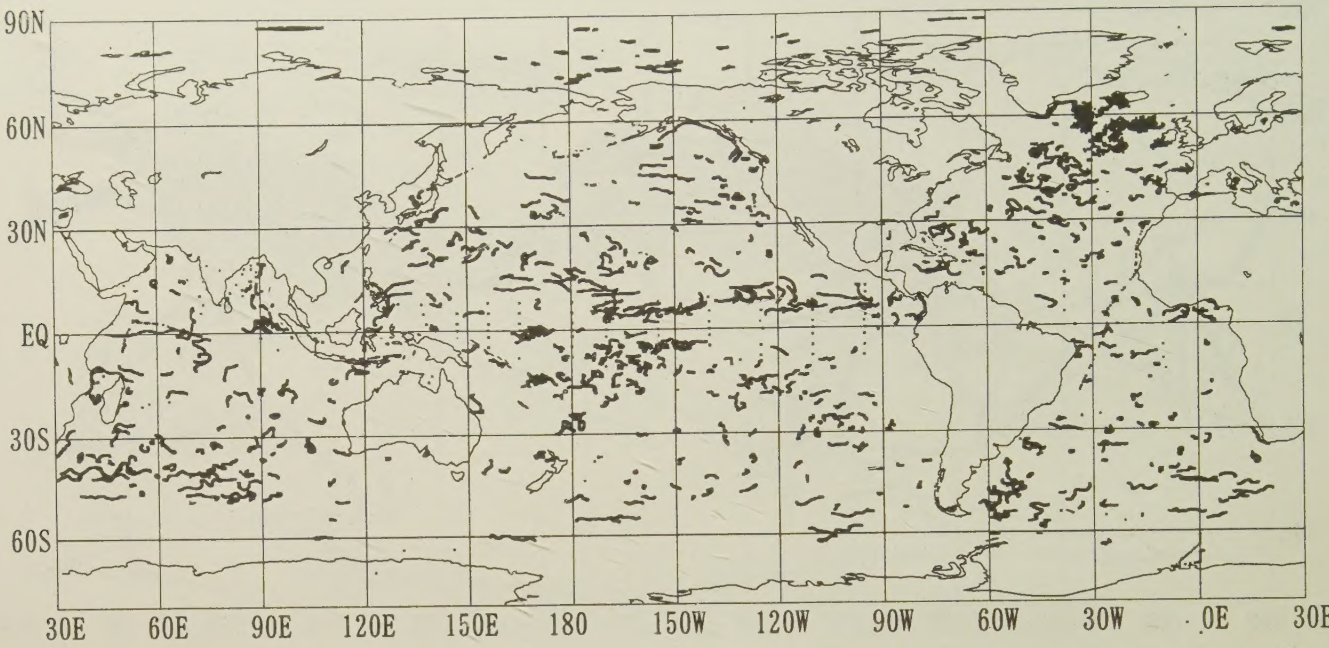
SHIP messages Total data:153459



BATHY/TESAC messages Total data: 3616

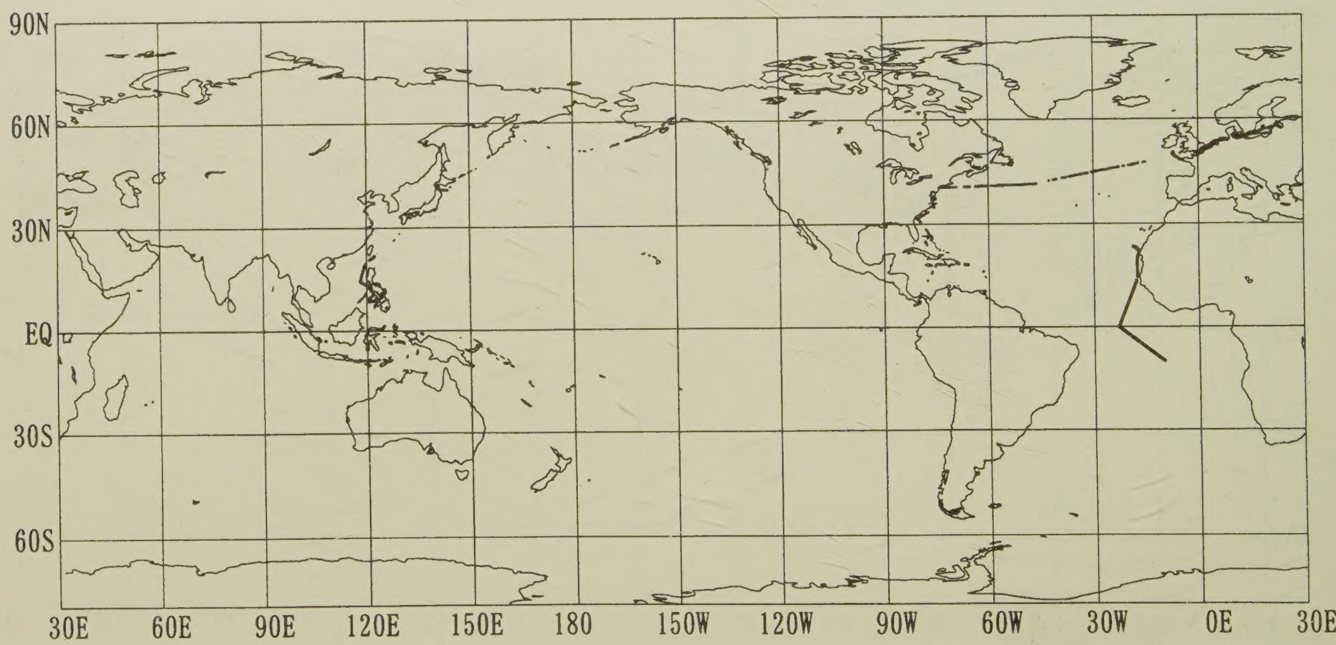
第32-1図　測点分布図(2002年12月)

Fig. 32-1 Geographical distribution of SHIP messages (SST data, top) and BATHY/TESAC messages (subsurface temperature data, bottom) for DEC 2002.



BUOY messages

Total data:470190



TRACKOB messages

Total data: 4379

第32-2図　測点分布図(2002年12月)

Fig. 32-2 Geographical distribution of BUOY messages (buoy drift and SST data, top) and TRACKOB messages (ship drift and SST data, bottom) for DEC 2002.

気　象　庁　海　洋　月　報

Monthly Ocean Report

December 2002 (No. 120)

本月報掲載の2002年12月のプロダクトには、気象庁が観測したデータ及びGTS（全球気象通信網）を通じて入手した国際気象通報式による通報のほか、下記の機関等から提供いただいたデータを使用しています。御礼申し上げます。

防衛庁、海上保安庁

水産総合研究センター

海洋科学技術センター、（社）漁業情報サービスセンター

東京大学

水産試験場等（北海道、青森県、岩手県、宮城県、秋田県、山形県、福島県、茨城県、千葉県、東京都、富山県、石川県、福井県、静岡県、愛知県、三重県、和歌山県、鳥取県、島根県、高知県、佐賀県、宮崎県）

（順不同）

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